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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CLII. No. 3001.] LONDON, NOVEMBER 17, 1920. [72nd Year. Price 8d.

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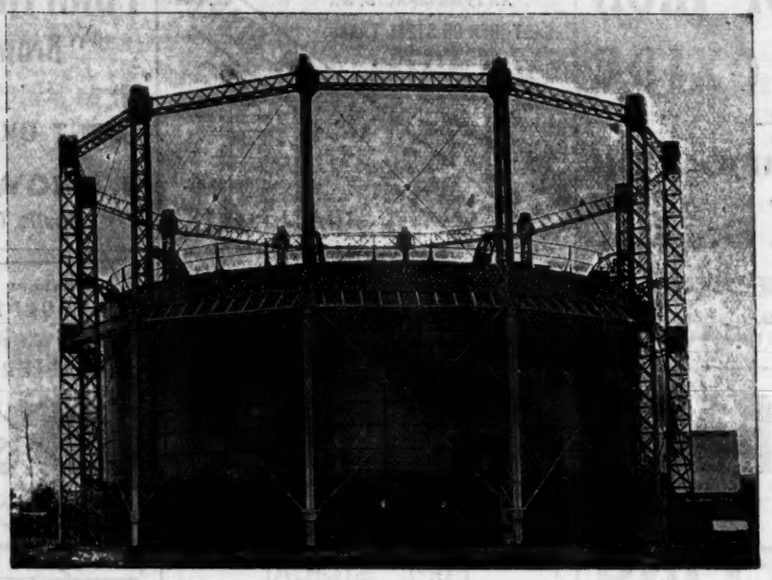

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLII., No. 3001.] WEDNESDAY, NOVEMBER 17, 1920. [72ND YEAR.

EDITORIAL NOTES.

The Price per Therm.

NOTICES of applications for Orders under section 1 of the Gas Regulation Act continue to stream in steadily. The proposed prices per therm naturally show considerable divergence, due to the influences of statutory and local conditions, and the differences in trading circumstances. Two interesting notices are those of the Gas Light and Coke Company and of the Commercial Gas Company, the latter of whom was subjected by the "Times," in publishing their notice, to a printer's error, which proclaimed to the world that the Company were asking for a standard price per therm of 15s. 6d.! This error, Dr. Carpenter claims in our "Correspondence" columns, is another point—he admits only a small one—to add to the contentions he has already put forward in favour of price movements being in farthings, and not by a figure which calls for the employment of a decimal point after the whole number in pence. The figure, of course, should have been 15·6d., which is the same price as is proposed by the Gas Light and Coke Company, whose effete standard is 3s. 2d. per 1000 c.ft. The 15·6d. per therm is approximately representative of the prices sought by many companies of front-rank position in the industry; and the fact of a widespread similarity we have no doubt will impress the Board of Trade. The coincidence is not an agreed matter; but, we believe, it will be found that there is a fairly computed and justifiable basis for the contiguity, in such cases, of the prices sought per therm.

Those who have not hitherto paid any particular heed to details may at first sight be struck by the difference between the 11d. per therm of the South Metropolitan Company and the 15·6d. per therm of the Gas Light Company. A little consideration will show various reasons for this. In the first place, the South Metropolitan Company have discarded the sliding-scale; and under their new system they are no longer to be subject to a reduction of dividend below 5 p.ct. should they have the misfortune to have to raise their price higher than 11d. When the price is below 11d., then the 5 p.ct. stockholders will have the right to a dividend advance according to the amount of the price reduction. Had the Company not secured the minimum dividend, it would have been impossible for them, in the new circumstances, to have been content with a standard of 11d. per therm. In the case of the Gas Light and Coke Company, the sliding-scale will continue to move both ways; and therefore, for this reason alone, the Company are entitled to better consideration in respect of dividend protection through the standard price than the South Metropolitan Company. The 11d., too, was, when the latter lodged their Bill, based on a 6 p.ct. dividend to the existing ordinary stock. Had the Directors known that the Lords Committee would reduce the minimum dividend of 6 p.ct. to 5 p.ct., we venture to think they would have asked for a standard price somewhat higher than the 11d., which under present conditions does not leave much scope for reductions of price and the restoration of the pre-war dividends. But, if experience shows it to be necessary, the Company have the right to apply to the Board of Trade for a revision of terms.

Then, again, the minimum dividend to be declared by the South Metropolitan Company is 5 p.ct.; the standard dividend of the Gas Light and Coke Company is 4 p.ct. Had the South Metropolitan ordinary stock been placed on a 4 p.ct. basis with the old form of sliding-scale, this alone, without other consideration, would have warranted the placing of the standard price per therm at something over 1s., in order to give proprietors 5 p.ct.—higher than that if the actual pre-war dividend had been sought as the standard, and still higher to maintain the 6 p.ct. dividend actually asked for, with (be it repeated) the slide both ways. Furthermore, there have been developments in costs since the South Metropolitan Company promoted their Bill. They could only judge the position on what was known at December, 1919. Additional increases have occurred in the prices of coal and wages; and so there is a considerable difference in costs, with no visible signs of reduction.

For these various reasons, the 15·6d. per therm on the 4 p.ct. basis of the Gas Light and Coke Company, with the sliding-scale operating in both directions, appears to us to be a figure which they will have no difficulty in upholding, and which in equity they should have awarded to them.

The Concealed Hand.

THERE are many ways of conducting propaganda for business purposes, and one that has lately grown is the deputizing of people to write letters to the daily or weekly Press—sometimes for payment, sometimes otherwise—as private and (on the surface) altogether independent persons. Many newspaper editors are "sold" by this form of communication, which comes along with a perfectly frank appearance, and so obtains publicity. Yet the letters may be only for the purpose of supporting some line of business or policy, or perhaps for unjustly defaming a competitor. Whether we have fallen upon an unsavoury piece of business of this nature, we are not quite prepared to say; but two or three facts are extremely interesting about some correspondence that has lately appeared in the daily papers in the interests of electricity, as well as for defaming the heat-unit basis of charging for gas, and for encouraging and stimulating public belief that it is simply a means of committing a statutorily authorized fraud. The letters that have appeared are excellent specimens of mendacity and deception. We hope the Electrical Development Association are not at the back of them; and we shall be glad to publish a repudiation from that organization of any connection with them, direct or indirect. They are letters that, though steeped in untruth, are dangerous to the gas industry, owing to the effect they may have on the public mind; and reply to them should not be neglected by responsible gas officials, or by the British Commercial Gas Association.

Now for the facts, which indicate that there is someone who uses the Conservative Club at Bexhill-on-Sea for letter writing to the Press; his speciality being support of the electricity industry and defamation of the authorized new order of things in regard to gas supply and trading. In the "Daily Mail" for Aug. 24 last there was published a letter headed "Coal-Saving Hints," and comment was made upon it in our "Electricity Supply Memoranda" for Sept. 8. That letter contained certain ridiculous statements concerning electric heating—one of which was that by it a saving of the nation's coal could be effected. The letter was signed "Reg. A. Cobb," the Conservative Club, Bexhill-on-Sea. Last week we published an article on "The Therm and the "Consumer," and used to illustrate our points the ignorance contained in a letter accepted by the "Daily Tele-"graph." This was signed "A Poor Consumer." It was addressed from the Conservative Club, Bexhill-on-Sea! The interests, operations, and pen names of this newspaper letter writer are obviously cast far and wide, for on Nov. 2, "An Old Reader" had a letter on "Gas by the Therm" in the "Newcastle Evening Chronicle," which was also addressed from "Bexhill!" Is all this pure coincidence? And what interest has the man at Bexhill in the gas consumers of Newcastle-on-Tyne? We have asked whether all this is pure coincidence? Without hesitation we reply

that it is not. In the "Daily Telegraph" and "Newcastle "Evening Chronicle" letters, there are words and phrases that are beautifully identical. There is no occasion to comment on the "Newcastle Chronicle" letter as we did last week on the "Telegraph" example. But we may, to show the object of the writer, just quote the salient features. The disinterested person, "An Old Reader," advises gas consumers to be "on their guard" concerning the new system of charging for gas. "The gas companies," so far as he can see, "have hit upon a very ingenious scheme "which will enable them to sell a 'thin' gas to the con- "sumer at a high price." He also infers that consumers are going to have no protection; and can only hope that the Gas Company will work up to their "stated" calorific value. We dealt with this point last week in referring to the "Telegraph" letter. There follows from "An Old "Reader" a good word for the price of electricity. It is a curious thing that "Reg. A. Cobb" and "A Poor "Consumer" should date their letters from the Conservative Club at Bexhill. It is also singular that "An Old Reader" of the Newcastle paper should hail from Bexhill. That there should be such great similarity between the two last letters proves a common origin.

Heat Economy on Gas-Works.

IN other columns this week, there is published a translation of a paper on the above subject read by Dr. Karl Bunte at the last meeting of the German Association. It is of great importance in these days, when it is the duty of every gas engineer to eliminate all waste to the farthest practicable degree, and to bring the economies into his balance-sheet. The paper reminds us of the one by Mr. Edward G. Stewart which was printed in the "JOURNAL" for March 30 last, in which he showed, by carefully prepared and easily understood data, the extent of heat energy loss in gas-works practice, and the places where operations should proceed to gain higher efficiencies. Dr. Bunte's paper alone is highly suggestive; but studied in conjunction with Mr. Stewart's contribution, it will be found even more so. While we can claim that the field of heat waste in gas-works has a smaller area than in any other coal-using industry, naturally it is in the best interests of the industry that the margin of waste between achievement, *plus* the minimum heat necessary for that achievement, and the potential heat value of the original fuel should be reduced to the utmost extent. But what is done in this matter must be dependent upon the cost of doing it, and the value of the result. For instance, it may pay a gas-works better to carbonize coal and directly gasify the resultant coke in one continuous process (preserving the tar in the first operation), and realize a 70 to 75 p.ct. efficiency, than to carbonize coal, and have a thermal return in gas, coke, and tar of (say) 85 p.ct. of the original value of the coal. Circumstances must govern the selection of operation in this regard.

However, the matter under consideration is the reduction of heat losses to dimensions as low as possible. Dr. Bunte puts forward three directions in which improvements in heat economy on gas-works are possible. The first one is in the choice of the fuel; the second, in more completely using up the fuel that is chosen; and the third, by avoiding loss of heat, and utilizing waste heat. As to the first, we are afraid that in this country the choice of fuel in the case of such large purchasers as the gas industry is governed more or less by availability. This must be so when a home and foreign demand exists which exceeds the supply, supplementing which disadvantage at the present time (apart from the strike) is the fact that distribution is not a matter that is allowed to be arranged solely between colliery and purchaser. The second suggestion can often only be made effective on a gas-works by a change of plant. But at the same time there are works which are conducted on traditional methods, and in which a complete examination of conditions, and serious attention to control, would result in a higher production efficiency. The third direction—working for the avoidance of heat losses, and utilizing waste heat—is one which can be profitably a matter for investigation in all gas-works. But there is a link between the second and third suggestions. Waste heat which is the product of plant or process inefficiency should be eliminated by displacing the inefficiency by efficiency. It is false economy to instal new or additional plant until (as Dr. Bunte puts it) careful management has got out of the plant everything possible which already exists in it. For instance, waste-heat boilers should not be introduced until it is certain that correct working of the settings has brought fuel consumption to the irreducible minimum.

Examination is made by Dr. Bunte, process by process, to ascertain where heat losses are found; and there is reference to various proposals that have from time to time been put forward for bringing such losses to the credit of existing efficiency. He first alludes to the heating of retort-settings, and to their proper control. The efficiency of the heating of the settings, of course, largely depends upon the degree to which regeneration is effected; and until one is assured that the working conditions are right, it is impossible to say how much waste heat there is actually for disposal. It is not an uncommon thing, however, for the waste gases from the benches to make their departure at from (say) 930° to 1290° Fahr.—the latter figure being somewhat common in vertical retort-settings, and instances are on record where very much higher figures obtain. If it requires from (say) 520° to 570° Fahr. to maintain the flue draught, then we get within the range of the two figures first mentioned between 400° and 700° Fahr. that is absolute waste, and which it should be the effort of gas engineers to reduce or utilize. The waste-heat boiler presents itself; and, when it is remembered that probably from 15 to 25 p.ct. of the fuel which a gas-works employs for its own purpose is used for steam-raising, the importance of obtaining steam from waste heat becomes very obvious. The position in which the waste-heat boiler is installed is important. Dr. Bunte suggests that it might be of advantage to arrange it at the outlet of the oven, where higher temperatures are obtainable than in the uptake flue—not only from the point of view of increase in boiler-heating surface, but also of the possibility of producing high-pressure steam. He also suggests that it might in some cases be worth while to bring the waste gases to the boiler at a temperature higher than the economical working of the setting would ordinarily indicate. But this must depend upon the proportions of steam required in any particular works. In the case of water-gas plants, with a thermal efficiency frequently not exceeding 50 p.ct., a waste-heat boiler should nowadays be regarded as an indispensable adjunct. In other directions for saving heat, condenser cooling water is used for boiler-feed purposes; and we see that Dr. Bunte mentions that in several German works part of the heat which would otherwise be lost by radiation is being successfully utilized by installing pipes at suitable points for heating water for boiler feed, baths, &c.

Another economy suggested is that good coke should not be used in the producers of retort-settings, but inferior fuel should be employed in central producers. Technical opinion is divided on this point of outside producers; and practice does not at present endorse the plan, although excellent results are obtained at various works. Dr. Bunte alludes to the saving of the heat in spent coke; but he does not make any very practical suggestion in this regard. The trend is, of course, to the system of carbonization and gasification in two operations in a combined plant. There is Sir Arthur Duckham's "ideal system," with which others have been and are in proximity. There is the interesting trial plant to which Mr. Frank H. Robinson, of Harrogate, called attention in our "Correspondence" columns on Nov. 3. In this case, the coal is carbonized at a low temperature in horizontal retorts; and a fine fluid tar is obtained. The coke is pushed direct into a water-gas generator. During the blow the producer gas is utilized to heat the retorts, and during the run the water gas passes through the retorts, sweeping out the coal gas into the hydraulic main. The system is so arranged that the producer gas and the water gas do not mix to any appreciable extent. The whole of the plant (except the blower) is contained within the limits of an arch of a horizontal retort-bench; and 180,000 to 200,000 c.ft. of gas per day are obtained from it. The make is well over 60,000 c.ft. of 325 B.Th.U. gas, and results as high as 365 B.Th.U. have been obtained. Taking the 60,000 c.ft. and 325 B.Th.U. gas, we get 19,500,000 B.Th.U. per ton; and allowing the tar a total calorific value of 2,000,000 B.Th.U., the gas and tar together would contain 74 p.ct. of the calorific value of a coal of 13,000 B.Th.U. per lb. We hope for more information as to the plant and working, with an analysis of the gas, which we should imagine would make a very fine diluent. The day may come when such gas will be distributed neat. However, the combined process does not give the high thermal efficiency to which some other workers are aiming; but the commercial value of the product and not the thermal efficiency will be the determining factor.

These and all the matters which Dr. Bunte explored with

the view to raising heat efficiency are highly interesting to engineers at the present time, when economy and efficiency stand for so much in the future prosperity of the industry.

The Government Official and His Dream.

IT is to be hoped that the Ministry of Transport is not going to run rampant into absurdity in connection with the development of electricity supply in this country. We feel confident that such men as Sir John Snell and his colleagues of the Electricity Commissioners are not anxious for that, and would prefer not to be made the subjects of ridicule through the acts of persons at the Ministry of Transport of unbounded enthusiasm and super-imagination, but limited knowledge of electricity. Sir John and his colleagues, there is no question, would much prefer that their work and the results should mature on normal lines, rather than that prophetic pictures of a highly coloured character should present to the public future conditions which practical men know full well cannot be realized, other than partially, owing to insuperable physical disabilities. The country had quite enough of the imbecile talk in the public prints and from political platforms that followed the issue some three years ago of the report by the Power Sub-Committee of the Coal Conservation Committee of the Ministry of Reconstruction. Then, we believe, the more intelligent part of the public looked upon what they were told as a lot of quackery; and in future (with current priced at anything from 8d. to 1s. 2d. per unit), they will want, in this connection, not promises of pie-crust formation, but actual delivery of the goods before they give any universal credence to what is said in this connection. In the good days to come, they were told two or three years since, rivers of electricity were going to flow through the land; that every cottager in the remote places of our rural world would be able to have electricity for light, heat, and cooking, and for cleaning his boots and his table knives, at a fraction of a penny per unit; and that millions upon millions of tons of coal would be saved per annum when all this came to pass. This nonsense has vanished into thin air. Practical knowledge laughed over it; electrical men were wrath at being made to look foolish in the eyes of the intelligent part of the general public; and the less intelligent part know now that they were deceived by the silly effusions.

"The Times," we were under the impression, is conducted by intelligent men; but our morning contemporary has made itself the vehicle for conveying to the public some inflated talk about what is expected to result from the work of the Electricity Commissioners. The Commissioners have now completed and published the provisional delimitation of the electricity supply districts in England; and so an official of the Ministry of Transport has communicated to "The Times" a picture of what, it is declared, the Commissioners anticipate is going to happen, and that within the next "few" years. If all the rest were true, the "few "years" would be untrue, for it would be a practical impossibility to do the work in any space of time that could be so described. What the enthusiastic official had to say will be found set out in a paragraph, side-headed a "A Beautiful "Picture," in our "Electricity Supply Memoranda" to-day. Electrical mains, we are told, will be laid throughout the big electricity districts, and supplies will be "given" for all kinds of purposes. This looks very charitable; but we take it there will have to be payment for the supplies. Whether people will be inclined to use it for "all kinds of purposes" will depend very much upon whether value for money is obtained. It is clear that railway electrification and rural supplies are expected to develop along parallel lines. The cables, it is said, that will be used for the purposes of railway electrification, will carry electricity into districts which otherwise it might not be possible to reach with commercial success. New factories, it is expected, will be built along the lines of railways through being able to get a cheap supply of power; and around them model villages will spring up. "In industrial towns factory chimneys will "disappear, black fogs will be mitigated, and steam-engines "will be displaced by electric-motors. The future house-"holder will use electrical domestic appliances much more; "thus conserving coal, reducing dirt, and improving health." The same old visions and mistakes! In a great deal of this work gas and not electricity will take the predominant part. It must be so if cost to the user counts for anything, and the conservation of coal is a national advantage. The imaginative official of the Ministry of Transport knows nothing as to the conservation of coal. If he did, he would not associate coal conservation with the use of electricity for heating purposes, or for the matter of that for power purposes in the case of long running and fairly constant loads, or for anything in the nature of stationary work excepting moderate powers and intermittent operations. The official at the Ministry of Transport should study this matter with the aid of the report on this subject made by Sir Dugald Clerk and Professors Smithells and Cobb. Not a single electrical expert has been able to challenge with success the integrity of the data in this report.

It is a pity the Government propagandists do not acquaint themselves better with elementary facts concerning such matters as these before dealing with them in a manner which appears to be modelled somewhat on the style in which scientific questions are treated in a certain morning contemporary. Possibly it is proposed to issue electricity loans; and this is one way chosen to whip-up interest. If so, it is not a way that does credit to a Department of the British Government.

Our Three Thousandth Issue.

The "JOURNAL" is now in its seventy-second year; and the issue last Wednesday was the three thousandth number. It was not at its inception issued weekly. Had it been, we should have been approaching our 3750th number. To place another thousand issues to our credit will take 19¼ years. We believe it may be claimed that the "JOURNAL" is the oldest technical and trade paper in existence. It had predecessors in various technical and commercial walks; but it has outlived them, and has developed with the gas industry.

Standardization of Gas Appliances.

When Radiation Ltd., was founded, and an amalgamation of the interests of certain gas-stove firms took place, from which it was anticipated that advantages would result—not only to the firms themselves, but to the gas industry at large, by the pooling of resources, brains, and effort—it was quite natural, with the effects of other combinations before them, that there should have been people who were a little bit sceptical and suspicious of the new arrangement, and who postponed their belief in the predictions, promises, and professions of faith of the prime movers until they were attested by deeds and not merely words. In a matter of this kind, deeds take time; but already it has been seen that results are accruing. The statement that appeared in our issue for Oct. 27, p. 195, as to what the amalgamated companies have accomplished in regard to standardization of parts and in arranging a programme for the immediate future are evidences of solid work. These matters were accentuated by Mr. H. M. Thornton in his remarks to the Southern Juniors last Friday, when they visited the new showrooms of the Richmond Gas Stove and Meter Company. From what he said, it is clear the originators of the fusion are certain they have done the right thing, and are satisfied that they are going to win the confirmation of the gas industry. To do this, as we understand, is at the head and front of their policy, in which standardization is an item that has made a big advance, principally so far in relation to gas-fires. Wash-boilers, boiling-rings, and cooker hot-plates are other articles; and a slot gas-cooker is on the slips. The scheme, in short, comprehends the whole range of productions which are subject to standardization. The value of the interchangeability of wearing and working parts cannot but be valuable, both in respect of working capital for stocks and labour expenses. We foresee the time when the claims of efficiency will cause hot-plate replacements to be made as a matter of course when cookers are in for renovation. The inefficiency of some old-fashioned hot-plates that are still in active service is a disgrace.

Recording Gas Calorimeter Developments.

Recording gas calorimeters are getting quite plentiful; but we hope this fact will not put an end to the exercise of ingenuity, as there is still room for perfecting developments in this line. It is a comparatively new avenue for work, and an interesting one; and it seems to us the demand for the most successful continuously recording calorimeter will be a prize worth having, not only on account of what is happening in this country, but because it

may become in time a world movement. It struck us at the time we were last describing the Thomas gas-meter that it would not be a great step to apply certain of the principles embodied in it to continuously recording the heating value of gas. It now appears that what then crossed the mind was an accomplished fact. The inventor of the Thomas meter, it will be seen from an article in other columns, has produced a recording calorimeter, in which the operating principle is that applied in the Junkers calorimeter, save that the heat-absorbing medium is air instead of water. The gas and air are both measured, and are in constant volumetric proportion. The gas is burned in a closed type burner, apart from the stream of cooling air, the incoming and outgoing temperatures of which are measured by a pair of electric resistance thermometers—the difference in temperature being recorded on a mechanically revolving chart at any convenient distance away. The temperature difference is directly proportional to the total heating value per cubic foot of gas. The temperature recording system is the same as that employed in the Thomas meter. It is stated that no corrections are needed; and the calorimeter indicates the total heat. The testimony of practical use and experience is required before departing from descriptive to commendatory terms. The instrument, however, shows that the area of scientific effort is expanding in this direction, and that invention is not being confined to any single groove.

Confidence in the Labour World.

We are glad to have the views of the Prime Minister on the industrial labour question. He is naturally an optimist, and a man of strong faith. In connection with any diagnosis of the labour position, however, we do not place much reliance on these good qualities. But the Premier has been in intimate touch with labour troubles since and before the end of the war, and so has been able to keep close watch upon the beatings of the labour pulse. According to his speech at the Guildhall banquet last week, he finds matters show a decided tendency to quiet-down, and to approach the normal. During the coal trouble and strike, he found the leaders anxious for an honourable settlement. But what is somewhat disturbing is that—the large vote against the settlement points to this—there is still an atmosphere of suspicion among some trade union men even of their own leaders. This has to be removed, and confidence not only in good leaders, but in the Government and in other classes has to be established. The difficulty is the presence of extremists in the leadership—garrulous men, who (as Mr. Frank Hodges, the Secretary of the Miners' Federation, puts it in a letter he has written to the South Wales miners regarding the resignation from the Executive of Mr. Hartshorn) are the framers of blood-curdling resolutions and meaningless generalities. These extremists are the men who were responsible for the heavy vote against the acceptance of the settlement, though fortunately not heavy enough to be effective. If the complete confidence of industrial labour is to be obtained, if there is to be a pulling-together all round, these extremists must be put back into their proper little corners. Only steady work by responsible men in the trade union movement can accomplish this. There is plenty of evidence to-day that these responsible men are getting utterly sick and tired of being forced into association with such wild and fatuous people.

Searching for Flame Silence.

The noise made by gas-fires has been corrected to a very large extent by the makers; and in the best types of fires, there is not much of which to complain, though absolute silence has not been achieved in all circumstances of burning. Some instructive information on the subject was given by Mr. H. Davies, of Messrs. Wilsons & Mathiesons, Ltd., in a paper he recently read before the Yorkshire Junior Gas Association, and a summary of which (prepared by the author) is published to-day. Mr. Davies has been experimentally investigating the subject, and has given his deductions from the work. It seems fairly clear that the makers of gas-fires have carried the investigation of this subject as far probably as they are able to do along physical lines; and (as already said) up to a point success in mitigating flame noises has been successful. But the mere turn of a tap on a gas-fire service, and hence the change in the balance of gas supply and aeration, show the difficulty of permanently realizing flame silence. We should like to see the research work into this subject carried further, by proceeding along chemical lines, with different compositions of gas. By subjecting the gas to analysis, ascertaining the exact constitution, and then burning it in one of the best gas-fire achievements of the makers, it would be possible to ascertain whether or not different compositions over a large range contribute anything to the flame noise. The results of the investigation might be of a negative order, and only of academic interest; but there might be something to be learned from them. On the other hand, we should prefer a little noise to the loss of a gas that mixes well with air, and the sacrifice of good heating flames and B.Th.U. economy. One word more. Invention has not yet brought us an acceptable air-adjustment fitting which is operated by the turning of the gas-tap, and so proportions the air admission to the flow of the gas.

Key-Industries and Anti-Dumping.

It is stated that the Key Industries and Anti-Dumping Bill will be introduced this session. Mantle makers and others will be interested in this, and will hope they will (as formerly proposed) be included, and receive adequate protection. This is a matter in which the gas industry is doubly concerned. In the first place, it is tired of the shoddy mantles that came from abroad, and that did an infinite amount of harm to the lighting branch of the business. In the second place, one of its secondary products is the source of dye materials. The Government have been much pressed recently as to the unfortunate position of the British dye-making industry, which has not had an opportunity of developing adequately before being subjected to the competition of considerable imports of what are known to be dyes of German origin. It is, as we intimated last week, the feeling that the dye industry here should be assisted for a few years in order that it may establish itself on such sound lines as to be able to meet foreign competition. It is considered probable that, owing to the exigent character of the help required by the dye interests, the Government may almost immediately introduce legislation on the basis of a licence for imports; but Mr. Lloyd George said in the House last Thursday that it would be rather too sanguine to anticipate that the measure could be passed before Christmas. Anyway, the Key Industries and Anti-Dumping Bill cannot possibly be passed before the prorogation.

The Rockwell Rotary Annealing Furnace.

There has been described by Mr. J. F. Springer, in the pages of the American "Gas Age," a rotary annealing and hardening furnace, made by the W. S. Rockwell Company, which is internally heated, and may be operated by gas. It is adapted to work that does not suffer by contact with the flames of combustion—such as the annealing of rivets, nuts, screws, &c. There is a cylindrical steel shell provided at the two ends with flanges, to which the heads are secured. At the charging end the head consists of a large drum; and there is an opening connecting the interior of the drum with the body. As the whole cylinder is rotated, the supply of work in the drum is drawn up once during each rotation; and this feature provides for a regular, substantially continuous feeding of fresh work to the heating compartment. At the discharge end the head is pierced by a central hole through which the gas jet is operated, and combustion air is drawn-in. The lining of the combustion chamber is a metal helix, or else a helix of refractory material. The helical groove brings the work continually onward from the charging end to the point of discharge; and as the work gradually moves forward its temperature rises. Everything is so adjusted that when the work reaches the point of discharge it has acquired the desired temperature. It then drops from the furnace, a little at each rotation. The articles may fall at once into a quenching bath, and from there be delivered by an elevator into cars waiting alongside. It is said that one of the machines has annealed 1450 lbs. of work per hour with the consumption of an amount of oil equivalent to 696 c.ft. of city gas, which means 2083 lbs. per 1000 c.ft. of gas.

Mr. Belton's Patent Air-Heater.—In the details of the test of Mr. F. W. J. Belton's new air-heater which appeared on p. 330 of last week's "JOURNAL," it was, by a printers' error, stated that the specific "gravity" of air C.V. = ·1686. It should have read specific "heat."

Loss of Gasolene through Evaporation.—It is announced by the United States Bureau of Mines that the entirely preventable losses in the evaporation of gasolene from crude petroleum, from the time the petroleum leaves the wells until it arrives at the refineries, reaches a total of more than 300 million gallons per annum. As already remarked, these are merely the preventable losses from evaporation alone, and do not take into consideration other losses. The worst feature of the matter is the fact that the gasolene thus wasted is the most volatile, and consequently the best quality of gasolene obtainable.

PRESENTATION TO SIR CHARLES JESSEL.

A PLEASING little ceremony took place at the meeting of the Board of the Imperial Continental Gas Association last Wednesday, when Sir Charles Jessel, the Chairman, was presented with the Association's long-service medal, on the completion by him—on Nov. 6—of 25 years' service.

Sir Charles's service reckons from Nov. 6, 1895, when he was first appointed a Director of the Association. It is not without interest that the Directorship which he holds has only twice exchanged hands in the course of 94 years. He was elected by his colleagues to the position of Chairman on March 25, 1913—an office which he has since continued to fill with dignity.

Sir Charles was the recipient of warm congratulations from his fellow-Directors, to which he replied in suitable terms.

The London staff had previously availed themselves of the occasion to convey to the Chairman their good wishes and their appreciation of the cordial relationship which has always existed between him and the staff.

PERSONAL.

Mr. A. HUGH SEABROOK, M.Inst.Mech.E., M.Inst.E.E., who is well known to many readers of the "JOURNAL," is now in practice as a Consulting Engineer at No. 11, Queen Victoria Street, E.C.; and as he is specializing on fuel economy and on electrical plant for gas-works, &c., they will, it is to be hoped, make still closer acquaintance with him in the future. Mr. Seabrook, it may be added, has been Engineer and General Manager to the Barking Electricity Supply and Light Railways and the West Ham and St. Marylebone Municipal Electricity Departments.

Mr. PHILIP H. SUGG, a son of the late Mr. William Sugg, has been appointed Managing Director of William Sugg and Co., Limited, of which his father was the founder. He received his early training as a gas engineer under his father, and has been associated with the Company during the whole of his business career. Mr. P. H. Sugg succeeds Mr. S. E. Thornton, A.M.Inst. C.E., who has filled the office for the past nine years, and has now resigned. The latter gentleman retains his seat on the Board as a Director of the Company.

Mr. FRANK HOLLYHOKE, Cashier and Chief Clerk to the Tipton Urban Council Gas Department, has been appointed Secretary to the Halesowen Gas Company, and expects to take up his new duties as from the beginning of next month.

Mr. STEPHEN HALSTEAD, who has been Manager for the past 23 years of the Wirksworth Gas-Works, has resigned his position. He went to Wirksworth from Todmorden. It is understood Mr. Halstead intends entering into private business in the North of England.

Mr. JOHN BROWN has been appointed by the New Mills Urban Council Manager of their gas-works, at a salary of £400 per annum. He has risen from the position of office boy under the Council to his present position.

Mr. W. BATT, of Stoke-on-Trent, has been appointed Assistant Distributing Engineer to the Newcastle-upon-Tyne Gas Company, in terms of the advertisement that recently appeared in the "JOURNAL."

A Committee of the Calcutta Municipal Council recently decided upon the appointment of Mr. H. V. EASTWELL as their Lighting Superintendent for five years from August last. Subsequently, however, on receiving another appointment, Mr. Eastwell withdrew his candidature; and following upon interviews with other candidates in England, Mr. TAYLOR has been unanimously appointed.

Mr. W. BRACE has accepted the appointment of Labour Adviser to the Ministry of Mines. His salary will, says the Parliamentary Correspondent of "The Times," be £1500 a year, with bonuses bringing it up to over £2000.

Yorkshire Junior Gas Association Programme.

At a meeting of this Association on Saturday afternoon next, in the Darley Street gas show-rooms, Bradford, Mr. G. Dougill, of Heckmondwike, will deliver his Presidential Address. Other fixtures for the session are:

1920. Dec. 18	Halifax	Paper on "Cooker Research," by Mr. W. Heathcote.
1921. Jan. 15	Wakefield	Visit to Vicarage Street gas-works; and paper on "Gas-Works Steam Raising," by Mr. H. L. Bateman.
Feb. 19	Bradford	Informal Meeting.
March 19	Leeds	Visit to one of the gas-works, and paper by Mr. G. V. Edwards.
April 20	Wortley	Visit to the Leeds Fire-Clay Company's works.

Among the papers to be submitted after Christmas to the Society of Arts is one by Dr. W. A. Bone, F.R.S., on "Brown Coals and Lignites: Their Importance to the Empire."

NATIONAL GAS COUNCIL DISTRICT BOARD.

For Yorkshire (West Riding).

THE Annual Meeting of the Yorkshire (West Riding) District Executive Board of the National Gas Council took place on the 4th inst., at the Great Northern Hotel, Leeds.

In their second annual report, the Management Committee stated that the membership of the Board now stands at 55, comprising 33 companies and 22 local authorities. The members of the Central Executive Board for the District—Messrs. C. Wood (Bradford), R. Halkett (Sheffield), H. E. Bloor (York), and A. E. Mottram (Ossett)—have attended many meetings in London, and have given much attention and care to the interests of the undertakings in the district. Mr. Halkett and Mr. W. B. M'Lusky (Halifax) have represented the district in the matter of the standardization of cookers, and Mr. C. S. Shapley (Leeds), on the subject of coal deliveries and stocks.

Mr. Charles Wood (Bradford) was elected Chairman of the Board, and Mr. W. Townsend (Wakefield) Vice-Chairman. Mr. Halkett, who retired by rotation, was re-elected on the Central Executive Board. The undertakings on the Management Committee were elected as follows: Doncaster, Halifax, Keighley, Leeds, Ossett, Huddersfield, Harrogate, Heckmondwike, Mirfield, Normanton, Sheffield, and York. Mr. F. D. Richmond (Heckmondwike) was re-elected Secretary.

Messrs. Fottrell and Ogilvie attended the meeting, and gave information in reply to various points regarding the Gas Regulation Act, &c.

FEDERATION OF GAS EMPLOYERS.

Yorkshire (West Riding) District Committee.

The Annual Meeting of the Yorkshire (West Riding) District Committee of the Federation of Gas Employers was held on the 4th inst. at the Great Northern Hotel, Leeds. Mr. Charles Wood (Bradford) presided; and Messrs. E. J. Fottrell and S. S. Ogilvie, of the Federation, were in attendance.

The report of the Management Committee was submitted and approved; and the following appointments were made: Chairman, Mr. Charles Wood; Vice-Chairman, Mr. W. Townsend (Wakefield). Mr. Wood was re-elected a member of the Central Committee.

The following undertakings were elected to the Management Committee: Doncaster, Halifax, Keighley, Leeds, Ossett, Huddersfield, Harrogate, Heckmondwike, Mirfield, Normanton, Sheffield, and York.

Mr. F. D. Richmond was re-elected Secretary.

Scottish District.

At the Annual Meeting to-day of the Federation of Gas Employers (Scottish District), of which Mr. George Braidwood, of Coatbridge, is Secretary, the Management Committee will report that the membership now consists of 44 undertakings—23 municipal, and 21 company, having a make in millions of cubic feet of 7702 and 1412 respectively.

The Management Committee have held seven meetings dealing with wages claims at various Scottish gas-works, as well as the national claims and awards of January and June, 1920; while the Committee considered it necessary to call the members together in August to have their advice with regard to a further claim for increased wages submitted at that time by the Federated Unions. This latter claim having been dropped, a scheme of zoning and grading was substituted, and agreed to between the Federation and the Federated Unions. This question has had the attention of the Scottish Regional Council representing the employers and the employed in the Scottish gas-works.

The importance of the question, and the amount of detail work involved, necessitated the formation of two separate Sub-Committees, one from each side of the Regional Council. These Sub-Committees are engaged on the preparation of a scheme which, when completed, it is hoped will have the effect of putting rates of pay in the different zones and grades on a more scientific basis. It is only by the support and the assistance of the members that a satisfactory scheme can be evolved.

The Scottish Regional Council came into existence in February last: Mr. A. S. Legat (Coatbridge) and Mr. J. Addison (General Workers' Union) being appointed Chairman and Vice-Chairman respectively. Mr. George Braidwood and Mr. F. Callaghan were appointed Joint Secretaries and Treasurers.

The Windsor Street works of the Birmingham Corporation Gas Committee are to be visited next Saturday by members of the Midland Junior Gas Association, who will have special facilities for inspecting the stove and meter shops, and also the experimental foundry.

Next Saturday evening, Nov. 20, the Scottish Junior Gas Association (Western District) are to meet in the Corporation Gas Department Workshops, Milan Street, Glasgow, to hear a paper on gas-furnaces, by Mr. John M'Isaac. On Saturday, Dec. 4, there is to be a visit to the Glenboig Union Fire-Clay Company's works.

ROMFORD VERTICAL RETORT INSTALLATION.

ON Saturday last, a new epoch in the history of the Romford Gas Company was entered upon, when the Chairman of the Company (Mr. Henry Johnson), supported by his colleagues on the Board, with the exception of Mr. Edward Wilshaw, who was unavoidably prevented from attending, laid a stone in commemoration of the completion at the works of a Glover-West vertical retort installation.

In reviewing the past history of the Company, which saw its inception in 1847, the Chairman described the phenomenal expansion of the Company's business, until at the present time the output exceeds 200 million c.ft. per annum. He pointed out that expansion is taking place not only in Romford, but also in the parishes of Upminster, Hornchurch, Gidea Park, and Harold Wood, which parishes come within the Company's area. As regards the vertical installation, he referred to the fact that West's Gas Improvement Company had completed the contract in a most efficient manner, and said the whole of the material was of the highest standard. The Engineer and Manager (Mr. J. C. Wright) stated that the contract had been executed to his entire satisfaction.

Messrs. West's representative, Mr. A. G. Bird, was present, and assured the Board that the plant, though guaranteed by his firm to produce half-a-million c.ft. per diem, was capable of yielding a far greater quantity. In passing, Mr. Bird pointed out that carbonization by vertical retorts is an ideal system, seeing that not only do they produce a large make of gas per ton of coal, but, further, they maintain the production of those national necessities, tar and ammoniacal liquor.

DESCRIPTION OF THE NEW PLANT.

The installation was arranged in an existing retort-house, and consists of one bench of Glover-West vertical retorts containing two beds of eight retorts each, arranged in units of two retorts—so that a quarter, a half, or three-quarters of a retort-setting may be put out of or into commission, as required.

The roof of the existing retort-house for the length of the new installation was removed, and a steel-framed structure was erected upon the existing walls for supporting the roofs over the installation and enclosing the sides and ends of the building. A louvre roof arranged over the retort-settings is supported from the retort bench; and side lean-to roofs span between the sides of the louvre framework to the framework which is carried from the existing walls.

The coal is brought to the installation by railway wagons, delivered to a four-roll claw-breaker, and elevated by a bucket elevator which delivers it to a push-plate conveyor running the length of the retort-bench, and provided with outlet doors for feeding the overhead coal bunkers. These have a capacity of forty-eight hours' supply to the retorts.

A lift is provided for elevating the coke for the producer feed, and for filling the retorts when starting the plant to work and after scurfing, and also to act as a passenger lift to gain access to the various platforms of the installation.

Two 14 B.H.P. gas-engines are provided for driving the coke-extractor gear and also the lift—one engine acting as a standby to the other. For driving the coal plant, a 26 B.H.P. gas-engine is provided—arranged in an engine-house adjacent to the coal elevator in the coal-store. The engines for driving the coke-extractors and lift are in a separate engine-house near the lift and extractor gear, so that the one line-shaft transmits the power to both lift and extractor driving gear.

The plant is designed for a future extension of one setting of eight retorts; and the plant has been so arranged that the extension can be carried out without any alteration or addition to the coal plant. To accomplish this, the elevator is placed at a suitable distance from the present installation, to allow of the future extension; and the head is carried on a steel structure supported from the horizontal retort-house wall. There is a bridge between this structure and the bunkers of the installation for carrying the push-plate conveyor.

The steel framework of the building above the existing retort-house walls is filled in with 4½-in. thick brick panels, and the roofs are covered with red "Eternite" slates. Roof lights (with patent glazing) are provided in the lean-to roofs on both sides of the retort-bench, and two lifting panels are arranged over each retort-setting, operated by gearing from the end of the retort-house.

The installation is adequately provided with staircases and platforms for gaining access to the various parts; the main platforms being connected-up to the lift framework which is provided with safety gates at the producer, at the top of the stack, and at the top of the coal bunker levels.

As already stated, the plant is arranged for a future extension of one setting without any alteration to the coal plant; but it may be further stated that the plant has been designed in the existing retort-house with the view that in addition to this extension two further installations each of two settings of 16 retorts can be placed in the existing retort-house when required, and the coal supply for these extensions be taken from the present elevator with the addition of a new push-plate conveyor on the opposite side of the elevator to the conveyor for the present installation.

The gas is taken from the retorts by a 15-in. foul-main to a 10-in. Parkinson and Cowan governor, from which point gas and tar connections are made to the existing mains.

In conclusion, it may be stated that the installation embodies all the latest improvements which have been developed from time to time from experience in the working of the Glover-West vertical-retort setting.

ELECTRICITY SUPPLY MEMORANDA.

LIGHTING subjects are being pressed to the front by our electrical contemporaries. They have come to the conclusion that the time is ripe for a revival in this direction; for at the moment, with the market price of units for heating and cooking at (say) 2d. to 3d., and prices of appliances of all kinds far exceeding the purchasing power of the ordinary householder, they are, we think, without open confession on their part, very much afraid that too much pressure just now in this direction will result in a set-back rather than an advance. The gas-filled lamp is the one upon which the electricians are now largely concentrating; and they are trying to make the best of its vulgar eye-impairing glare, its shorter life than the metallic filament lamp, and the absence with it of flickering and the constant labour claims of the old arcs, which are wherever possible being abandoned. It is something to get free from the jumpy effects of arc lighting; and the luxurious costliness of labour to-day makes electrical men glad enough to find ways and means of avoiding it to the largest practicable extent. The gasfilled lamp for street lighting is one way; but the point is impressed that scientifically designed fittings must be used in order to secure the maximum effects from the lamp. In the City of Westminster, high or low pressure gas-lamps are largely used. Where they are not, arc lamps have been displaced by double drop arms on the standard; and from them gasfilled lamps are suspended in "Metropolitan" lanterns. Notwithstanding the short life of gasfilled lamps, it is said maintenance costs are low compared with arcs; but it is not said whether "low maintenance" includes the high cost of renewals. The lamps are of the 750 watt type; so each standard requires 1½ units per hour. We take it therefore that each double lamp standard is supposed to give 1200-candle power. Perhaps they do when new, and the glasses clean. But we know they do not give that light for very long; and to say that combined they constantly give 18,000 lumens per hour is stretching absurdity. Temperature and ventilation are very important in the use of gas-filled lamps in lanterns; and in the "Metropolitan" lantern (a product of the General Electric Company) a current of air is drawn continuously over the lamp. The reflector surface is finished in white vitreous enamel; and holophane refractor globes are used. A like movement is going on throughout the country; and it looks as though the time will come when arc lamps will be rare in our streets.

Modern Electric Street Lighting.

Lumen and Cost Comparisons.

With increased main pressures, and greater economy in the production of B.Th.U. the gas way, there is not the slightest doubt that we shall get by the aid of the burner makers more lumens for a given cost than by the gasfilled lamps. We say this notwithstanding that one electrical lighting specialist—Mr. Haydn Harrison—makes a comparison in the "Electrical Review" with gas at 4s. 2d. per 1000 c.ft. (a domestic lighting price in many towns), and 1·76d. for electric street lighting! The latter figure must be in exceptional cases in these days—in municipal towns we take it, where a preferential rate for electricity exists for street lighting. At the 4s. 2d. figure for gas, it is calculated that (for low-pressure incandescent lighting be it marked, and not high pressure), the cost is 0·25d. per hour for gas per 1000 lumens; while the cost per 1000 lumens with gasfilled electric lamps is printed as "·0145d." The point should be after the "0." This is shown by calculation, as well as by the statement that the cost of the current is 58 p.ct. that of gas supplied in the same districts. The figures taken by Mr. Haydn Harrison—not his own, but from an American source—are for low-pressure inverted burners, 0·4 lumen per B.Th.U. of the calorific value of the gas; while the high-pressure inverted mantle is only credited with 0·525 lumen per B.Th.U. On the other hand, the gasfilled electric lamp is credited (we make out by calculation) with 3·51 lumens per B.Th.U., or a consumption of only 285 B.Th.U. per 1000 lumens as against 2500 B.Th.U. per 1000 lumens with the low-pressure inverted lamp. We are not convinced as to the accuracy of these figures. What value there is in such comparisons it is difficult to see. The overall cost is the correct one; and this should have as an ingredient commercial prices for current, as during the lighting peak no electric station can to-day afford to supply current for lighting at 1·76d. per unit. The figures published by Mr. E. W. Dorey (referred to in the "Memoranda" for Oct. 27) are interesting in this connection. We should like to point out, too, that Mr. Haydn Harrison's basis for gas, being American data, is no doubt for gas of high calorific power per cubic foot; and through the difficulties with such gas of obtaining proper admixture of the air and gas, and therefore complete combustion, it is impossible to develop flame temperature and such a high light efficiency per B.Th.U.

as would be possible with a lower calorific grade gas. In Mr. James Jamieson's address published last week, it will be observed that he remarks that the Gas Department of Greenock has been able to secure with low calorific power gas the lighting of all the new streets at present being formed in the burgh.

Housing and Duplicate Systems. Some local authorities with electricity undertakings are showing how spendthrift they can be. Several have arranged for the electric lighting of artizan's houses (with gas for cooking and partial heating purposes), and yet they know that artizan dwellings are the worst revenue-producing of any lighting customers. Many electrical men acknowledge that they would be better off without the custom. The same thing, but not so severely through lower capital cost, applies to some prepayment gas consumers. The lighting is merely an auxiliary to the gas consumption for cooking, water-heating, &c., and not the main part of the business. Yet thousands upon thousands of pounds are being spent for electric lighting only in some of the housing schemes. This is extravagance of the mad order. With gas-mains in position for cooking, and water and occasional room heating, all that is required is the piping of the houses to the lighting points off the same supplies. There are complaints now as to rises in the rates; there will be greater cause for complaint later on. Mr. Jamieson in the address referred to in the previous paragraph makes a protest. "Without being partizan in the matter," he writes, "I say distinctly that as gas is cheaper than electricity even in the cost of laying on supplies, then from a public utility standpoint only gas—the cheapest form in which that heat can be obtained—should be provided for. In Greenock miles of cables are being laid down at present which, I am certain, will never be remunerative; and a similar state of affairs exists elsewhere." It is to be hoped that, when these housing schemes are completed, and there has been experience of the business done, there will be insistence on the publication of the expenditure incurred, the annual capital charges involved, the revenue obtained, and the consumption of current.

Loan Difficulties. The difficulty of raising loans at a reasonable rate of interest is a disturbing matter. "Meteor" of the "Electrical Times" calls attention to it. He finds it a little depressing to learn that Birkenhead wants £44,000 for electric plant, but is none too sure of raising this trivial sum. That is the trouble. It is a universal trouble unless high rates of interest—such as 8 p.ct.—are paid, accompanied by other inducements. The Chairman of the Finance Committee of the Birkenhead Corporation has told his friend, the Chairman of the Electricity Committee, that he had better wait. There are other schemes requiring financing in the borough, but the same trouble exists. The Electricity Committee are hoping that the Electricity Commissioners may come to their relief. But the Commissioners cannot dissipate their loan authorization on schemes for developing local stations; the money is intended for the development of the joint schemes of generation and transmission, which is a totally different thing.

Capital Expenditure and New Business. The ratio of capital expenditure to output is sure to increase in future. This cannot be helped when all new work is costing two to three times pre-war sums. Mr. Harold Dickinson, in his address as Chairman of the Liverpool Sub-Centre of the Institution of Electrical Engineers, states that before the war the capital charges of an electricity station were almost equal to all the other charges put together; but fortunately they have not shown the large increase which has been added to other items. He explains this. In some stations, the item has exhibited a very substantial reduction, owing to the growth of output, and through the reduction of the margin of reserve plant. This can only be a temporary advantage. Plant cannot go on for ever. All extensions, all replacements, all maintenance must be at the higher costs; and as these creep into the whole, the average must advance. All increases of demand that necessitate new plant at to-day's cost mean that the demand is being supplied at an additional capital cost; and it makes the position so much the worse for old consumers. Of course, we know that this applies to gas as well as to electricity; but not in the same proportion—that is, capital charges in relation to output. Moreover, the possible economies of gas in relation to the output of B.Th.U. are proved by their materialization where opportunity has allowed the adoption of new plant or change of process. The economies in connection with electricity appear to be largely limited to fuel expenditure; and the electrical profession is waiting curiously and hopefully for the demonstration from one large generating station of the expectation that its efficiency will be 24 p.ct. A 24 p.ct. generating efficiency will not apply to many stations for years to come. The best has first to be made of existing plant; and large stations require for the promotion of their best efficiency favourable districts. Electricity supply areas were not designed for generating stations; the generating stations have to be designed for the district. And all districts do not, or cannot, support the highest attainable efficiency in areas more generously endowed from the electrical point of view. Then all new lengths of cable put in, all new services, and all new meters mean a considerably higher cost. This absorbed into the whole does not make the average look appreciably more; but standing by itself, the capital cost shows a large increase in relation to consumption, or revenue-producing capacity, unless special circumstances attach to it.

A Beautiful Picture. We do not anticipate that it will all happen—at any rate, not for years to come. But still an official of the Ministry of Transport has shown great imaginative power, and has been sketching for the delectation of the public—using the Press as his medium of communication—a picture of the goal to which the Electricity Commissioners are aiming. The Commissioners have now practically completed the work of defining the electricity supply areas for the industrial and the principal centres of England and Wales, and are now dealing with Scotland. They are also working towards a standardization of systems. He states that electricity will be generated in a much smaller number of larger stations than now exist—stations to which coal can be transported easily, and where there is an abundance of necessary water. Electrical mains will be laid throughout the big electricity districts, and supplies will be given for all kinds of purposes. When a line of railway is electrified, the cables will penetrate into districts which otherwise it might not be possible to reach with commercial success. From these cables neighbouring villages and small towns now without a supply will be able to get one; and these radiating cable systems will give supplies to farmsteads. New factories can be built along the line of railways, able to get a cheap supply of power, and around them model villages can spring up. In industrial towns factory chimneys will disappear, black fogs will be mitigated, and steam engines will be displaced by electric motors. The future householder will use electrical and domestic appliances much more—thus conserving coal, reducing dirt, and improving health. There will be less waste in transport, less scavenging, and less cleaning and redecorating of premises. It is commonly thought, too, that discharges of electricity properly applied to growing crops can largely compensate for the variability of English weather. An experiment near Hereford is so promising that a very greatly extended system is now in course of construction; and the demand for electricity by farms will be very great indeed. Not only will richer harvests be obtained by its use, but ploughing, harrowing, reaping, binding, and threshing will be carried out by electrical appliances. Extensions of electric distributing systems throughout the country, especially in rural areas, will enable very many sources of water power, now remote and neglected, to be used, to "pump" continuously into the general electric system—thus preventing what is now a large total of waste. Far greater production will reduce the cost to the consumer; and the reduced cost will make it more easily available for all purposes. This is a very beautiful picture of the electrical future. It is stated that it is the development "confidently expected" by the Commissioners during the next "few" years. The Commissioners will probably be interested in learning this. Practical men will liberally discount it all.

Electrical Mishaps. The safety of electricity and the freedom from accident continue to be demonstrated in a manner which those who proclaim its virtues in these respects do not approve of. On the authority of our "Lest We Forget" friend—the "Electrical Review"—we see that it was reported that as a result of damaged and flooded mains during the recent fire at the Hop Exchange, the supply voltage to a number of buildings was augmented to such an extent that many electric lamps blazed up, the filaments fused, and the glass bulbs broke. On the South London Railway there was recently a stoppage through an electrical accident. Subsequently—last Sunday week—when a train drew up at Trafalgar Square Station on the Bakerloo Tube, motor trouble declared itself, and apparently the short-circuit affected another train running into Oxford Circus. For a time there was a complete paralysis of traffic on either side of the two affected stations. By a coincidence at exactly the same time a westbound train on the Piccadilly and Brompton Railway, on arrival at South Kensington Station, was found to be on fire. The fire broke out in the back of the train, and rapidly spread along the rear coach, causing a stampede among the passengers. Not through an accident, but a strike for more pay, Berlin had to do without its electricity supply last Saturday week. The graphic account that appeared in the papers of the city's consequential trials and tribulations was not a pleasant one.

The late Mr. Abel John Ram, K.C., M.A., Recorder of Wolverhampton, who died last August at the age of 77, left estate of the gross value of £60,851, with net personalty £52,300.

The Public Service Commission for the City of Baltimore have signed an order establishing the standard of gas at 500 B.Th.U. This reduction of the standard from 550 B.Th.U. will, it is said, avoid an increase in the price.

On Feb. 14, 21, and 28, Dr. Eric K. Rideal, M.B.E., M.A., F.I.C., will deliver at the Society of Arts a series of Cantor Lectures on "Applications of Catalysis to Industrial Chemistry." He will deal with catalysts in the gas industry, incandescent mantles, surface combustion, and synthesis of ammonia.

RICHMOND'S NEW SHOW-ROOMS AND OFFICES.

Gas-Heating Demonstrations in Charming Surroundings.

FRONT VIEW OF Nos. 164-172, QUEEN VICTORIA STREET, E.C.

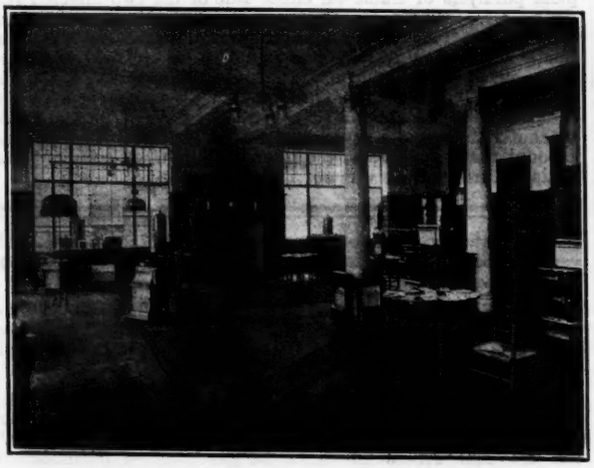
ON an island site facing St. Paul's Station on the South-Eastern and Chatham Railway, and fronting on to Queen Victoria Street, there is a fine building formerly in the occupation of Messrs. Spiers and Pond, Ltd., and now tenanted by the Richmond Gas Stove and Meter Company; and it constitutes to-day the largest set of show-rooms and offices devoted to gas-heated appliances to be found in the City of London. Great enterprise is shown in the place. The Richmond Company have always had men at the top whose habit it has been to take long strides, and never to admit that there was no room for further advance. This is another advance; and it requires no stretch of the imagination to say that every piece of enterprise of this character made to convince the public of the efficiency of gas, and the fitness of gas-consuming appliances for all forms of dwelling appointments, is not only a gain to the manufacturer of such appliances, but an advantage to the gas industry on account of its educational mission. The benefit between manufacturer and the gas-supply industry is mutual and indivisible.

FROM SMALL BEGINNINGS.

The new show-rooms have been in possession of the Company for some twelve months; but it is only within the past three months that the great building has received the finishing touches which give to it the air of completeness for the work—business and demonstration—that it has before it. As we stand in the show-rooms, it comes almost as a shock to be told that the occupation of the premises marks the thirtieth year of the foundation of the Company. Memory flies back. It brings to mind the little factory in Warrington with its ten employees. There is a picture of two dogs, entitled "Dignity and Impudence," which has often attracted our attention. In 1890 it seemed almost impudence for that little concern boldly starting-off as a competitor of the big, well-established gas-appliance firms that then existed. But there was no impudence; there was a sturdy intention to make the small beginning expand to greater things. What was aimed at then was not the development that has been actually achieved, which far exceeds the most sanguine of the Richmond expectations of three decades since. Sound policy and organization, the aid of technical ability, persistent research, and commercial instinct compounded into one, have carried the Company on and on; and to meet the demands upon them, they have had to step from one state of accommodation to another. So it came about that in this particular direction of activities the old London showrooms and offices at 132, Queen Victoria Street became too small for the business. There was not sufficient space for display, and such display as is best with fitted appliances in situations and rooms as nearly as possible similar to some of the main rooms in our ideal of a home. Nor was there sufficient office elbow-room with the growth of business. There is all that is required here. The situation of the new showrooms and offices is good. They can be conveniently reached from anywhere. There is St. Paul's Station, the District Railway, and trains, trams, and buses all handy at the door.

DECORATIVE FEATURES.

Being on an island site, the new showrooms and offices are entirely self-contained; and light and air are on all sides. The general scheme of decoration throughout is of oak panelling with light coloured walls above; the floors are of wood parquet. Everything harmonizes—walls, doors, windows, furniture. Each floor of the place, especially the first floor, is a study in artistic design and



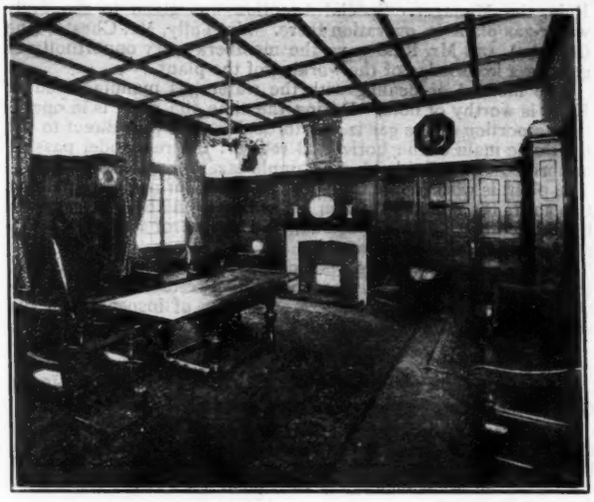
Half of Ground Floor Show-Room, looking West.

Ground Floor Show-Room, looking East.

finish. The work was carried out by the Nautilus Fire Company, Ltd., who are linked with the Richmond Company, and who have earned a high reputation for the handsome showrooms executed for gas undertakings. In this instance, Mr. E. A. Swan (who is associated with the Richmond Company) was responsible for the design. We can only say we have seen nothing better in character or effect for the purpose in view, which does not debar a legitimate claim being made for equality with the West-end. The photographic illustrations, however, bear testimony to our opinion as to the character of the Richmond showrooms; the eyes of visitors will have ample confirmation.

On the Ground Floor.

We are on the ground floor, with its pannelled walls, parquet flooring, rugs, chairs, tables bearing literature, busy attendants, and the inanimate specimens of the firm's productions—other than those in operation. A mention of some must suffice, though fine specimens of workmanship all. We look round upon cooking appliances—"high-grade" was the compound adjectival term used; and we could see they were. "High-grade" receives illustration from every point of view. There are the "New Model" and "Bungalow" types, as well as examples of large cooking apparatus for hotels, restaurants, and canteens. Turning round, we are attracted by and linger over the water-heating apparatus. Here are the well-known "Ironclad" and "Equator" circulating boilers, geysers of all descriptions, and the "Lyn" boiler. These are all fitted and in action, with suitable baths and basins, so that demonstrations can instantly be made to visitors as to the capabilities of gas for the important service of heating water. Very particular care has been taken in arranging this display, as the



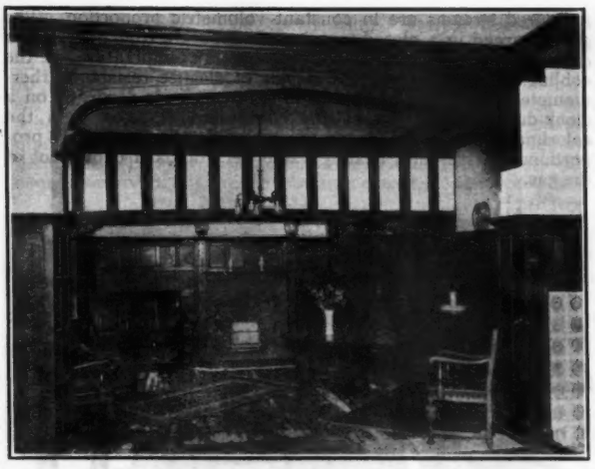
Managing Director's Office and Board Room on the First Floor.

Company are convinced that in the direction of hot-water apparatus there lies a great field for the further development of gas. And they are right. Circulating boilers are also shown connected to hot-water radiators. This is important, as competition in this direction, though not very effective, is arising from the electric radiator, which from the thermal point of view is very poor.

In the spacious windows the pedestrian is attracted by a display of cookers on one side of the entrance, and by gas-fires on the other. These latter are shown in ingenious window fittings each with a backing of suitable tiles, which are removable so that a change of display is readily made. The tops of these fittings do not obstruct the view from the outside into the show-room, so that from the street its whole extent can be seen.

An Attractive First Floor.

Ascending the staircase to the first floor show-room, this has been devoted entirely to the display of high-class "Period" gas-fires, each in its appropriate setting; the tiled surrounds and recesses, some of them of quite a unique character, being handsomely set-off by contrast with the oak panelling. On the west side of the building there is a charming ingle nook, correct in every detail of the period to which it belongs, with a recessed grate built of old-English bricks and an "Ionic" period fire installed. Of course, in that period gas heating was unknown; but nevertheless the fire matches the ingle-nook. On this side of the building is also a retiring room containing another beautiful example of a recessed grate with a "Renaissance" period fire. The room has been thoughtfully dedicated to the use of any visitors to London who wish to telephone, write letters, consult directories, &c. Antique furniture is used in keeping with the whole scheme; and it gives the room a stately appearance. On this (first) floor are the Managing Director's office and Board Room, which is also utilized as a demonstration room. Here the visitor can see how gas-fires of appropriate design look in a room that illustrates genuine refinement and comfort. The gas-lighting fixtures are well proportioned, excellent examples of the metal worker's art, and admirably harmonize with the general decorative style.



The "Ingle-Nook"—showing the "Ionic" Gas-Fire (Period Series).

The Offices and Above.

On the second floor are the offices. Commodious, bright, well-ventilated, and thoughtfully arranged, they are models of convenience for working, and replete with all modern labour-saving devices and up-to-date office equipment. Separate offices are provided for the London sales manager, the heads of departments, and others. The third floor is devoted to the office dining-room and kitchen, and to a display of large cooking apparatus for hotels, restaurants, and canteens. Interested, we linger long in examining much that is of interest not only to the gas and business man, but to the user of gas.

Fitting and Installation Department.

Descending by the passenger lift, we are taken to the basement, in which are stock-rooms, with a large portion devoted to the fitting and installation department—the Company's work in this direction being very extensive. A hydraulic hoist conveys goods from a back entrance to the basement, where all unpacking and packing are done.

Technical Success.

This is a mere adumbration of what is to be seen. Though environment throughout the place is pleasing and attractive, the interest of the technical gas man is largely claimed by the appliances on view. The Company in thirty years have progressed remarkably. This progress the appliances examined show has been made along the road of technical improvement. The things of thirty years ago are not the things of to-day. Much water has passed under the bridges during these years. Much thought, time, research, and money have been expended in the effort to secure greater efficiency in all directions, and to promote convenience and utility. That success has resulted is the verdict silently claimed by the appliances on view. The claim is freely accorded.

THE THOMAS RECORDING GAS-CALORIMETER.

By H. N. Packard.

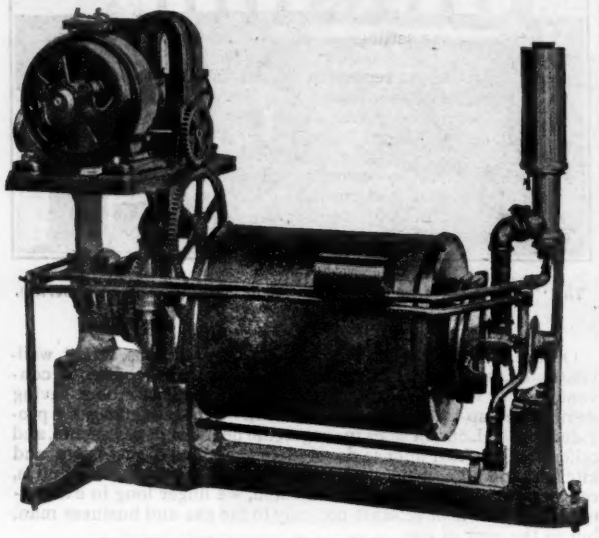
[From the "American Gas Association Monthly."]

With the rapid change from the candle power to the heating value standard for artificial gases, the gas-calorimeter is rapidly becoming the most important control instrument used in gas-plant practice. The calorimeter readings are not only essential in the general interests of the public, but also serve as a direct indication of the efficiency of the gas-making processes, showing immediately the effects of improper operation. The calorimeters in general use at present are highly satisfactory as to accuracy and simplicity, but require the entire time of skilled operators to obtain intermittent results at sufficiently close intervals for good plant regulation.

To meet the demand for a continuous record of heating value of the same order of accuracy as is obtained by present manually operated calorimeters, but without requiring the services of an operator, a new design of calorimeter has been tried-out. This calorimeter is an automatic continuous gas-calorimeter furnishing a record and indication of the total heating value of a gas. It has been the aim throughout the design of the instrument to eliminate all arbitrary settings and calibrations, and to give a final record of the total heating value of a gas free from any corrections for measurement conditions.

The calorimeter consists of two water-sealed drum-meters geared together and mounted in the same case, a burner and calorimeter body, two resistance thermometers, and a clock-driven recorder. The operating principle is essentially the same as in the well-known Junkers calorimeter, excepting that the heat-absorbing medium is air instead of water. One of the wet meters is used to measure the gas to be sampled, the other measures the cooling air. As these meters are geared together, the two

measured streams are in constant volumetric proportion. The gas is burned in a closed-type burner separate from the stream of cooling air. The incoming and outgoing temperatures of the cooling air are measured by a pair of electric resistance thermometers; and their difference in temperature is recorded on a clock-driven paper roll at any convenient distance from the calorimeter proper. This temperature difference is directly proportional to the total heating value per standard cubic foot of the gas.



Recording Calorimeter, Meter Units, and Burner.

Air is used as the cooling medium because of the ease with which it may be accurately proportioned to the gas stream. The two wet drum-meters are power-driven, so that the air and gas streams may be measured at atmospheric pressure—thus eliminating the need for sensitive pressure regulators. Both streams of gas are brought into intimate contact with the common water-seal used for the two meters. Consequently, they are both saturated with water vapour, and are at like temperatures at the point of measurement.

The temperature rise in the calorimeter is independent of the actual speed of the measuring devices, and is dependent only on the heating value of the sample. For instance, if a certain meter speed gives a 20° temperature rise and the meter speed be doubled, twice the gas will be passed; but at the same time twice the cooling medium will also flow, and the same temperature rise will be obtained. On the other hand, any change in the heating value of the gas consumed will cause a corresponding change in temperature rise.

The temperature recording system employed is the same type as that already thoroughly worked-out in the Thomas gas-meter, and is extremely sensitive and reliable. It has the particular advantage that any desired correction law may be applied by proper design of the recorder electrical resistances. Compensation is made by this means for the increasing dilution of the gas with water vapour at high operating temperatures; and in consequence the calorimeter accuracy is unaffected by variation in room temperatures over wide ranges.

As both the gas and air meters are mounted on a common base, and are provided with a common water-seal, the only requirement for setting is that the meters be reasonably well levelled. The meter designs are such that changes in the water-level affect both meters alike; hence their ratio of measurement is unaffected by change in water-level. With this design, an ordinary weir overflow is used, which regulates the water-level with sufficient accuracy for satisfactory measurement.

The meter designs are somewhat unusual, to suit the special requirements of this service. In the first place, it is essential to regulate both air and gas to atmospheric pressure at the point of measurement. The method used to obtain this condition is to power-drive both meters and supply air and gas to their intakes under atmospheric pressure. To obtain a meter of reasonable diameter and accuracy for gas measurement, it is designed with a series of curved tubes mounted on the outside of a rotating drum. This meter is shown at the left in the illustration. The air-meter is a simple casting built like a uniform pitch screw-conveyor. It is the large drum in the centre.

No mention has been made of a third meter of the tube type mounted on the right-hand head of the air-meter. This meter is used to supply completely saturated and tempered air to the gas-burner for combustion purposes. It is desirable to furnish this combustion air in fixed ratio to the gas, so as to ensure, without any adjustments, satisfactory combustion.

To maintain a slight circulation of water through the calorimeter, an auxiliary tank is provided below the main tank; and a small chain pump brings up the water from the lower storage tank, spilling it into the main tank. The surplus water flows over the main tank weir, and returns to the storage tank.

The recorder is a unit which may be located at any desired distance from the main calorimeter parts, and from this recorder may be obtained graphic and indicated readings of the total heating value. The recorder is furnished with a novel type of electric clock, which requires no winding, and will operate continuously as long as power is supplied to it. This clock, being of the pendulum type, and independent of spring tension, gives much more accurate timing than may be obtained from the usual types of recording meter clocks. The whole operation of the calorimeter is controlled from this recorder case, including start, stop, and ignition of the gas at the burner. The only attention required by the instrument is an occasional oiling, replenishment of water, adjustment of level, and a change of recording charts.

The calorimeter is connected directly to the gas-line and any lighting circuit, and requires no water-piping or water-storage tank. Additional recorders may be located at any part of the plant where duplicate heating value records are desired.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Visit to the Kelty and Kinross Gas-Works.

ON Saturday last, the Eastern District of the Scottish Junior Gas Association visited the Kelty and Kinross Gas-Works. There was a large attendance, including several seniors, notwithstanding the difficulty of train services.

The members were conducted round the Kelty works by Mr. Rule, the Manager. Special attention was given to the Tully water-gas plant in operation there. Mr. Tully, Mr. Chester (the Chemist), and Mr. Rule gave the members every opportunity of gaining a knowledge of the working of the plant.

The method of dealing with the water gas manufactured at Kelty is worthy of note. During the time the plant is in operation, a portion of the gas is fed through a 2-in. pipe direct to the hydraulic main of the horizontal retorts: the remainder passing unpurified to a relief holder, of ample size to hold a day's make. The plant is worked one shift per day; and during the remaining two shifts the unpurified water gas is fed from the holder to the hydraulic main. Thus a constant admixture of water gas with straight coal gas is maintained.

From Kelty, the visitors were conveyed by motor char-a-banc to Kinross, where Mr. D. Campbell (the President of the Association) conducted the members on a tour of inspection of his works. A most interesting time was spent.

HON. MEMBERSHIP FOR MR. TULLY.

Subsequently, the party were conveyed by motor char-a-banc to the Green Hotel, Kinross, where Mr. Tully entertained them to high tea.

The PRESIDENT occupied the chair, and extended a hearty welcome to all. He expressed the gratitude of the Association to Mr. Rule for his services that afternoon. To his mind, the fact that Mr. Rule did not regret the installation of the Tully plant was a strong recommendation in its favour.

Mr. RULE, in replying, said it had been a very great pleasure to him to be of service that afternoon. He was always a seeker after the truth; and in his search he was greatly indebted to his brother gas managers. He therefore hoped that any services he had rendered would similarly benefit members. He wished, however, to express his gratitude to Mr. Tully, whose help had been invaluable; and he asked the members to accord him a hearty vote of thanks.

Mr. W. A. DEARDEN (Dunfermline) said a very pleasant duty had been entrusted to him. The Council had agreed to ask Mr. Tully to honour the Association by becoming one of its honorary members. This decision had been arrived at in view of the services Mr. Tully had rendered, not only to their Association in particular, but to the gas profession as a whole.

Mr. TULLY said this had come as a great surprise to him; and it gave him great pleasure to accept honorary membership of the Association. He thanked the Council and members for the honour conferred upon him; and hoped that in the future he would be enabled to be of further service.

The Management of the South Metropolitan Gas Company.—Under this heading, the current issue of the "Co-Partnership Journal of the South Metropolitan Gas Company" says: "An important development in the administration of the Company's business has been made by the creation of the new office of General Manager [noticed in our pages on Oct. 20, p. 135]. It is not a matter of surprise to those who have any knowledge of the growing complexity of the Company's post-war activities that the Board should take this step in the direction of centralizing control. The choice of Mr. Frederick M'Leod for the new post is welcomed by all. During the 12½ years Mr. M'Leod has been Secretary he has had to perform many of the duties that will pertain to the new office; and his knowledge of the Company's business is unsurpassed. Mr. Frank Day has now had the duties of Secretary added to those of Chief Accountant. In 1912, Mr. Day succeeded Mr. T. J. C. Coggin, to whom he had for some years been assistant, as chief of the Rental Department; and in 1914, on the retirement of Mr. H. C. Sims, he was appointed Chief Accountant. We are confident co-partners of all ranks will rally round both General Manager and Secretary, and help to make the future of the Company worthy of the record of its past."

HEAT UNIT ECONOMY ON GAS-WORKS.

[THE following is an abstract translation of a paper read at this year's meeting of the German Gas Association by Dr. Karl Bunte, of Karlsruhe, as printed in a recent number of the "Journal für Gasbeleuchtung." At the conclusion of his paper, the author stated that he had not gone into details of technical problems, but had rather attempted to indicate certain directions in which gas men might look for opportunities of saving heat units. It is in this light, therefore, that the paper should be read.]

INTRODUCTION.

In the year 1919 the coal production of the world was 33 p.ct. short of the pre-war quantity. This shortage has raised the value of present supplies to such an extent that in every country and in every industry there is now the greatest need for carefully watching consumption. Improvements in heat economy are possible in three directions: First, in the choice of fuel; secondly, in more completely using whatever fuel is chosen; and, thirdly, by avoiding any loss of heat, and utilizing all waste heat.

GAS-WORKS AS CENTRES OF HEAT SUPPLY.

After reviewing briefly the great advances that have been made by gas-works and coke-ovens in the direction of getting all possible value out of the coal distilled, the author states that another great change has been accomplished. Gas-works, which were originally suppliers of light, have become more and more centres of heat supply. They give back, in the products of carbonization, some 75 p.ct. of the calorific value of the coal; while the best steam-works convert only one-tenth, locomotives one-twentieth, and industrial furnaces (on an average) only one-tenth to one-third into power and products. Compared with other industries, therefore, the gas-works give good showing in the way of fuel economy. But, naturally, much more is expected of them than from textile or machinery works, for instance, whose fuel bill is perhaps only 5 p.ct. of their total working costs. It is, however, useless to point out where and why heat units and valuable products are being lost, unless it can also be shown how their saving may be accompanied by financial gain. In this respect, much recent criticism has been of no avail.

MANAGEMENT AND PLANT.

In order to test the heat economy of gas-works, either in general or in any particular instance, a careful examination must be made of the various items of fuel expenditure, from which can be seen where lie the big losses, and where the small ones; where saving can be effected by more careful control; and where by the installation of new plant. It is false economy to instal new plant until careful management has got everything possible out of that which already exists. For instance, waste-heat boilers should not be introduced into a works until it is quite certain that correct working of the settings has brought the fuel consumption to the irreducible minimum. One should first effect all possible improvements by improved control, and then see what more can be done by improvements to plant. Having laid this down as the guiding principle, the author proceeds to examine in detail the various branches of gas-works practice in which economy is possible.

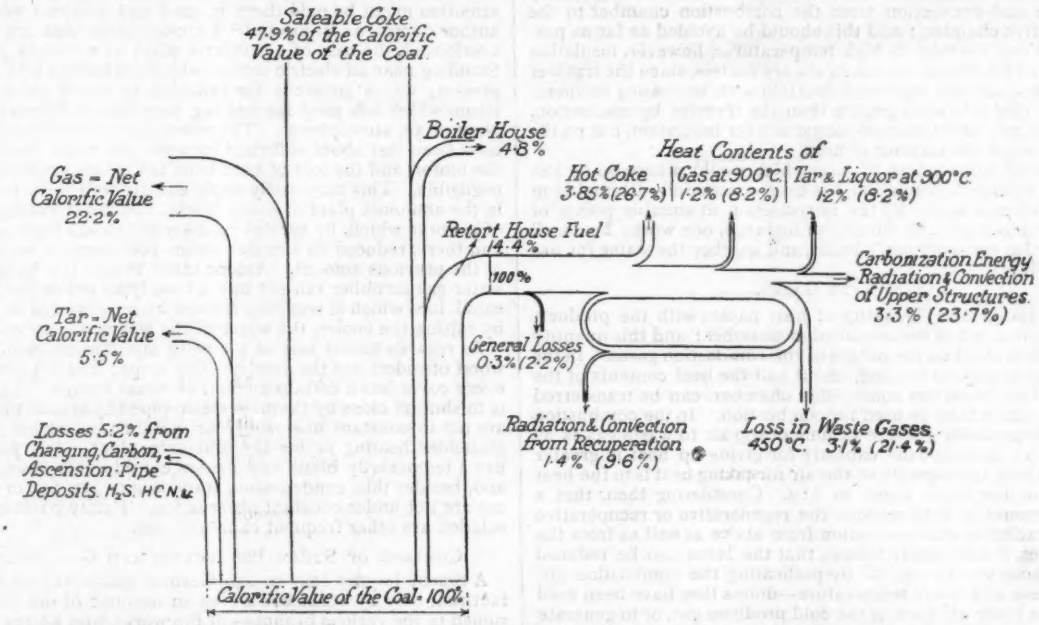
HEAT DISTRIBUTION DURING CARBONIZATION.

The accompanying heat diagram can only be taken as giving an approximate idea; and with different settings results may vary by several per cent. Roughly speaking, however, it shows that the calorific value of the coal is split-up by carbonization, so that 20 to 30 p.ct. passes to the gas, 5 to 8 p.ct. to the tar, and 60 to 70 p.ct. to the coke. The splitting-up of the coal in itself can scarcely be said to require much heat. But the carbonization process, to produce large quantities of gas, and to be effected quickly and so save capital costs, must be carried out at high temperatures. This involves considerable expenditure of heat, which cannot be saved, but can, to a certain extent, be recovered later.

HEATING THE RETORTS.

For heating the settings, about 15 p.ct. of the calorific value of the coal is used-up in one form or another. To effect economy in this direction, which represents by far the biggest item in the gas-works' own fuel consumption, we must first of all look to efficient management. The figures which are ordinarily given in gas-works' statistics are open to criticism. In the first place, they are generally given in relation to the amount of coal carbonized. Surely they should be given in relation not to the raw material used, but to the finished product—that is to say, per cubic foot of gas, or per 1000 B.Th.U. produced. Gas-works are too apt, the author considers, to throw dust in their own eyes with regard to fuel consumption in the retort-house. Since it is, quite rightly, often looked upon as an important standard by which to judge working economy, efforts are generally made to show the figures as low as possible; and this often leads to rough calculations instead of accurate weighing.

These calculations are perhaps made as follows: From 100 tons of coal we get 70 tons of coke. Of this, we sell 50 tons—leaving 20 tons for producers and boilers. If the boilers use 4 tons per 100 tons of coal carbonized, the producers must be getting 16 tons of coke per 100 tons of coal. The result of this is that the amount of coke estimated to be used in the retort-house depends on the moisture in the coke sold; and, while soaking the coke may be a very good proposition commercially, it is hopeless when one is trying to find out whether the retort-house is working economically or otherwise. First and foremost, then, the actual consumption of the producers should be frequently tested, in order to see that they are working economically; and at the same time improvements may be effected by carefully watching the combustion.



APPROXIMATE DISTRIBUTION OF HEAT UNITS IN THE DISTILLATION OF COAL FOR GAS PRODUCTION.

To go into details as to the control of heating the settings would be to depart far from the present theme. Suffice it, therefore, to say that the efficiency of the heating depends upon the quantity of carbon dioxide present in the gases as they leave the retort space—that is to say, as they enter the regeneration or recuperation chambers. To ensure good working, a check must be kept on this, in order to see that combustion is taking place without excess of air or loss of carbon monoxide.

Careful control and improvements in heating the retorts must accordingly be given first place in any efforts at heat economy. When all possible has been done in this direction, there are other points to notice, which the author proceeds to examine.

HEAT CONTENTS OF THE PRODUCTS.

The heat contents of the gas, tar, and liquor have to be destroyed by cooling. Properly effected cooling is of such importance to the whole conduct of gas-works, that it must be given greater consideration than the question of recovering the heat units. It will, therefore, generally be a question of finding, if possible, a use for the cooling water, rather than for the heat units it contains, since the latter can scarcely be recovered in practice from water at a

temperature of 30° to 60° C. Likewise it is extremely difficult to recover the heat contained in the hot coke as it leaves the retort, which amounts to some 700 B.Th.U. per lb. The coke which is used for the producers is often fed-in before quenching; and so very little of its heat is wasted. But the difficulty with the bulk of the hot coke is that such masses of heat units became available in isolated quantities, both as to place and time. Experiments were made at one works with steam quenching in large tanks, with the object of making water-gas. But the system was later abandoned. Zürich tried conveying heat from the coke to the boilers by means of incombustible gases, which circulated between the hot coke and the boilers. But the only method adopted to any great extent for saving the heat from the coke is to convey it by means of radiators to the upper air in the ovens. There is, of course, an equivalent heat value in the waste gases; but this is more easily useable, as it is a regular supply, and does not occur at intervals, like hot coke from the retorts.

Radiation and Convection.

Heat losses under these headings mainly depend, of course, upon the construction of the settings. The smaller the exterior radiating surfaces are as compared with the interior heat-conducting surfaces of the carbonizing chamber, the smaller the losses by radiation and convection in any given period. Insulating stone has been suggested, but has been used only occasionally, and then rather as a protection to men against the heat of the ascension pipes or hydraulic mains, and so forth, than with the object of conserving heat. In the case of high-built settings, loss of heat is caused primarily by air passing through the retort-house being driven upwards. This should be prevented. At Stuttgart, double mouthpieces are used to prevent loss of heat; and these are found to have other advantages besides. A common form of loss is by radiation and convection from the combustion chamber to the recuperative chamber; and this should be avoided as far as possible. When working at high temperatures, however, insulation schemes which depend on air strata are useless, since the transfer of heat by radiation increases fourfold with increasing temperatures; so that it is soon greater than the transfer by convection. The air or gas strata then no longer act for insulation, but on the contrary assist the transfer of heat.

The direct employment of heat which would otherwise be lost from the settings by radiation has been successfully attempted in several German works by the introduction at suitable points of piping arrangements, by which, for instance, one works heats all the water for the workmen's baths, and another the water for use in the boilers.

Waste Gases.

By far the greatest quantity of heat passes with the products of combustion out of the combustion chamber; and this quantity depends first of all on the nature of the combustion gases. In the case of producer-gas heating, about half the heat contents of the gases, as they leave the combustion chamber, can be transferred to the air which is to be used for combustion. In the combustion of normal producer gas, the volume of top air to waste gas is as 1 : 1·58. As, however, the capacity for giving-up heat is greater per cubic foot, the capacity of the air for taking heat is to the heat contents of the waste gases as 1 : 2. Considering then, that a certain amount of heat reaches the regenerative or recuperative plant by radiation and convection from above as well as from the waste gases, it necessarily follows that the latter can be reduced only to about 500° to 600° C. by preheating the combustion air. If they leave at a lower temperature—unless they have been used to heat the lower air flues or the cold producer gas, or to generate steam—something is wrong with the construction of the plant or the working of it. The author points out that a saving of even only 1 p.ct. in fuel for an ordinary setting of eight retorts, charged every four hours with 2·75 cwt. of coke per charge, will amount to a saving of over 24 tons of coke in the year. The advantages of central producers as regards the control of combustion are obvious. But even at the very best the waste gases before regeneration or recuperation will contain from 50 to 60 p.ct. of the calorific value of the coke; and of this about half can be used-up by preheating the combustion air.

Using the Heat of the Waste Gases.

We have, then, 25 to 30 p.ct. of the calorific value of the fuel coke leaving the setting as waste heat. The great difficulties in the way of using this up have always been the necessity of economizing space in the retort-house, and the objections to introducing into it any more plant than is absolutely necessary—especially such as needs a certain amount of cleanliness. Several projects (and even actual installations) have been abandoned, such as for drying wood and peat, or vegetables and food waste for fodder purposes, and in one case for evaporating ammoniacal liquor. But a great many gas-works have installed successful systems for steam-raising by means of waste heat from the retort-house. One German authority has estimated that there should be enough heat under this heading to suffice for all the power, steam production, and heating of buildings required on a gas-works, which, in the case of a medium-sized undertaking, would represent some 3 to 5 p.ct. of the total coal used for gas making. Naturally larger heating surfaces will be required in a waste-heat boiler than in one of the ordinary type; and therefore the increased cost of material must be considered in estimating the saving that can be effected.

No more heat must be taken out of the waste gases than will reduce them to 270° to 300° C.; otherwise the flue-draught will not work properly. But, as they become available at 500° to 700° C., considerable heat can be removed from them. Care must also be taken that the temperature of the boiler falls as seldom as possible below the dew-point of the gases, as would be the case if it is often put out of use, or if the feed-water is too cool. Condensation on the outer surfaces is apt to be very harmful, owing to the sulphur contents of the gases.

Boiler Working and Steam Distribution.

About 15 to 25 p.ct. of the fuel which gas-works use for their own purposes is for steam-raising. It is a generally known fact, but one to which sufficient importance is often not attached, that the heat contents of steam under several atmospheres compression and of low-pressure steam differ by very small amounts. In other words, when sufficient heat has been expended to produce the steam, comparatively little more is needed to make the steam do considerably more work. Against 600 units of heat that are used to produce a quantity of steam, only 30 units more are required to bring the same quantity to 10 atmospheres compression. On the other hand, when the compression has done its work, the steam still retains practically the whole of the heat used to produce it. In the question of saving heat units, therefore, efforts should be made as far as possible to produce all steam at high pressure, whether it is to be used for heating or for power purposes as low-pressure steam, and to allow it to do some work or other before its ordinary use. Naturally difficulties may be met in endeavouring to use the steam in this way, especially as in gas-works more steam is often used for heating than for power production. The employment of waste steam, and the using again of condensation water, may present insuperable difficulties in large and scattered works; but they are worth trying for, and more attention might be paid them in small and compact works. The author quotes, as an example of opportunities that are apt to be overlooked, the case of a briquette plant at a certain gas-works. Standing near an electric motor, which worked the briquette compressor, was a governor for reducing to 0·5 of an atmosphere steam which was used for heating purposes, and brought to the plant at 5·5 atmospheres. The power lost by this reduction would have been just about sufficient to work the whole plant without the motor, and the loss of heat from the steam would have been negligible. This may easily apply equally well to the pumps used in the ammonia plant of many works. Another example is that of a works which, by careful consideration and a little saving here and there, reduced its summer steam consumption to two-thirds of the previous amount. Among other things, the water from a water-gas scrubber ran out into a tank lying below the level of a canal, into which it was then thrown by a steam ejector. Simply by raising the cooler, the whole of the steam was saved.

As regards actual loss of steam in distribution, doubtless the worst offenders are the condensation traps; and not infrequently every cover lets a certain amount of steam escape. A good plan is to shut-off close by the main steam-pipe any branch pipes which are not in constant use—such, for instance, as supply pipes for gasholder heating or for the ammonia plant. Any pipe which has a temporarily blank end causes considerable condensation; and, besides this, condensation traps which are not in constant use are not under constant observation. Faulty packing and insulation are other frequent causes of loss.

Control of Steam Production and Consumption.

A recent inquiry sent to 250 German gas-works revealed the fact that only 15 works could give an account of the steam consumed in the various branches of the works, and a large majority did not even know their total steam consumption. It would appear, therefore, that there is considerable scope for saving steam simply by more careful control, and without installing new and costly plant. It is true that in most cases a check of some kind is kept on the fuel used in the boiler-house; but this is rarely compared with the steam produced. By measuring the feed-water—an operation which should not present any great difficulty—a vaporization figure can be arrived at which will show the respective values of all available fuels, and the working efficiency of the plant. This will probably demonstrate the advisability of a further check on boiler-house working by means of a test on the products of combustion, for which quite a number of satisfactory methods are known. But above all, a record should be kept of the feed-water used; for this gives the first basis of comparison between the steam that may be expected to be required in the various departments and the steam that is actually produced. This comparison, the author states, will show the most surprising results in a great many cases. The division of boiler plant according to the several departments where steam is used, instead of working into a main steam collecting pipe, may also be of considerable use, when practicable. The installation of steam consumption meters will only occasionally be possible, but many other schemes have been described in the technical press, or can be thought-out individually, for estimating what becomes of the steam produced, and for booking against each department its own share of the boiler-house costs.

Waste-Heat Boilers.

One word more concerning waste-heat boilers. Since the heat required to produce steam at 5·5 instead of 0·5 atmospheres is greater by only 5 p.ct., it follows that the capacity for heat transmission per unit of boiler surface need only be very little greater; and, if the number of heat units taken out of the waste gases for

boiler heating remains constant, these gases may be introduced at only 50° higher temperature to raise the boiler contents by 50° also. It may, therefore, be of considerable advantage to arrange a waste-heat boiler at the outlet of the oven, where higher temperatures are obtainable than in the uptake flue—not only from the point of view of increase in boiler-heating surface, but also of the possibility of producing high-pressure steam. With the same object in view, it may even in some cases be worth while bringing the waste gases to the boiler at a temperature 50° higher than the economical working of the settings would ordinarily indicate. But all this must depend upon the proportions of steam required at any particular works for heating and power respectively.

SUPERHEATED STEAM.

A few words more on this subject. The superheating of steam has two results. In the first place, the steam can give up heat units without condensation setting-in. Secondly, for each centigrade degree of superheating, the volume increases by 1/273. Therefore, 273° C. superheating will double both the volume and the velocity of flow of the steam. Moreover, superheated steam behaves like a fixed gas. On the one hand, therefore, heat and condensation losses in the pipes would be avoided, but on the other hand the delivery of heat per unit of heating surface would be correspondingly reduced, if it was intended to use superheated indirect steam for heating purposes. Saturated steam should therefore, naturally be used for all purposes of indirect heating.

WORKING-UP AMMONIACAL LIQUOR.

The next big demand for heat and steam is found in the ammonia still. Modern plants use up the steam heat excellently. The raw liquor is preheated by the outflow, and so a large proportion of heat is brought back to the process which would otherwise be wasted. Certainly considerable quantities of heat are lost; but they are not practically recoverable—the temperatures dealt with not being sufficiently high. In view of this, the author sees little chance of saving in this department, unless in some cases circumstances allowed of waste steam being substituted for fresh steam in some manner.

PRODUCER-GAS PROCESSES.

The chief thing to aim at in this department, if heat units are to be saved, is to avoid burning large quantities of one's best coke in one's own retort-house. All possible should be done with this object in view, even with separate producers. Central producers, however, are found to be far less fastidious about their fuel; and in 1918 the Lichtenberg works were able to save 25 p.ct. of their firing costs by using lignite briquettes instead of coke. Still more recently their No. 2 works have been saving at the rate of Mk. 700,000 a year by recovering the lignite tar in their producer process. The central producer offers the advantages of being much more easily regulated, and working more regularly than individual producers. A considerably greater proportion of the heat produced—78 p.ct.. against 60 p.ct. at the very best—can be used in the combustion chambers of the settings. A large part of the sensible heat is recoverable at the producer in the form of steam, and can be returned to the producer gases before combustion. But perhaps the greatest advantage of the central producer is the cutting-down of losses due to unconsumed fuel in the slack, which amount to an average of only 0·5 to 2·5 p.ct., against 10 p.ct., or even more, which is generally found with ordinary systems.

WATER-GAS PROCESSES.

In the usual water-gas process, heat losses are considerable—35 to 40 p.ct. of the calorific value of the coke generally going to waste with the hot blast-gases. Of greatest importance is the correct regulation of the steaming and gas-making periods; and this calls for careful control on the part of the management. A further 9 to 10 p.ct. is lost by cooling from the water gas and the water vapour unavoidably not decomposed. The manufacture of water gas is, therefore, a by no means economical process; and, in the opinion of the author, the fact that it is constantly growing in importance in gas-works practice points to the great fuel shortage. At any rate, it is better than a reversion to the old practice of heating with raw coal. He refers briefly to suggestions that have been made for using the heat contained in the hot blast-gases for steam-raising. It might even pay in some cases to prolong the steaming periods with this object in view.

American Coal-Tar Industry.—The United States Geological Survey have recently reported that the production of coke and bye-products during 1919 shows a slight decrease as compared with the previous year, owing to labour troubles in the steel and coal-mining industries, and to railroad congestion. There appears to have been a small decrease in the amount of tar distilled, and a large decrease in the output of pure benzole, and especially of pure toluol. This means that a much larger proportion of the output was sold as mixtures for solvent purposes or as motor spirit, instead of in the purified condition. Of more significance, however, says the Chief Chemist of the United States Tariff Commission, in considering the future of the coal tar chemical industry, is the fact that the productive capacity of the bye-product coke-ovens in America increased 17·2 p.ct. during 1919. There is no question that, with the possible exception of anthracene, adequate supplies of the fundamental raw materials of coal-tar origin will be available from American sources for the growth of the industry.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Show-Rooms and Offices of the Richmond Gas Stove and Meter Company.

The success of the first visit of members of the Association arranged for this session was such as to astonish even its most enthusiastic supporters. An invitation had been extended to them to inspect last Friday afternoon the new Queen Victoria Street show-rooms and offices of the Richmond Gas Stove and Meter Company, Ltd.; and recognition of the nature of the treat in store for them led to anticipation of a large attendance. This anticipation was realized to an extent that forced Mr. H. M. Thornton (the Managing-Director) to admit, with evident gratification, that the Association had fairly "taken them by storm." When all were assembled, they must have numbered fully 150; but the arrangements had been well planned, and proved fully adequate to the occasion.

As the visitors arrived, they were afforded ample opportunity of inspecting the spacious and handsome premises, of which an illustrated description will be found on p. 386 of this issue. In filling the part of host to this large gathering, Mr. Thornton was enthusiastically assisted by many members of the staff, who were kept quite busy drawing attention to and explaining the many features of interest. Among these gentlemen were Mr. J. F. Wicks (London Sales Manager), Mr. Pratt (Messrs. George Glover and Co.), Mr. Browne (Clark's Syphon Stove Company), Mr. Poole (Office and Advertising Manager), and Major Richardson (Show-Room Manager).

Tea in the general offices was followed by a flashlight photograph; and then the whole party settled down to listen to an address (with lantern slides) by Mr. Thornton, who, in extending on behalf of his Company a very warm welcome to the Association to their new show-rooms, said this was the first organization to pay them an official visit, and they were glad that it should be a Junior Association who accepted their initial invitation. The Association were to be congratulated on the valuable work they were doing in educating their members, and in enabling them to get that wide vision of the industry as a whole which they might otherwise miss in the pursuit of their daily vocations, and which was so valuable if progress and development were to be made.

MR. THORNTON'S RETROSPECT.

Giving to his address the title of "1890 to 1920—A Retrospect," Mr. Thornton proceeded to draw attention to, and illustrate upon the screen, some of the important stages in the history of the Company, and the steps by which the position has been reached in which they find themselves to-day.

The Richmond Company was, he said, formed in 1890, and started operations in a small building in Scotland Road, Warrington. The staff consisted then of about ten men, at least one of whom is still in their employ. Small as were its beginnings, its policy was conceived on sound lines. Its expansion was rapid; and a brief period sufficed to bring it to the fore-front among gas-stove makers. Rapidly outgrowing the original premises, larger ones were secured in Academy Street, Warrington. This building, with additions at various times, served the firm's purpose for some years; and they still occupy part of it. The main works, however, are now at Grappenhall, about two miles out of the town of Warrington, and cover 9 acres. Very shortly now they will have completed their whole plants, when the present building in Academy Street will be given up.

While the manufacturing side was progressing very rapidly, the sales side of the business—or the "distribution department," as it would be termed in the gas-supply industry—was naturally making equal strides. While profits may be "made in the retort-house," and while economical and efficient works production are of vital importance, yet the selling staff must be at least as able and competent if over-production is to be avoided, and a ready market always provided for output. The Richmond Company, therefore, many years ago organized their selling staff, and divided the country into territories; and the plans were so well conceived that they remain the basis of their organization to-day. Many schemes were devised, which sound strange to our ears to-day, so commonplace have the ideas become; yet they were new only 25 or so years ago. For instance, about 1894 the firm urged the advantage of fixing slot-cookers to all prepayment meter installations, and showed the profitable investment they represented. They demonstrated the desirability of developing day and summer consumption; and as a means of educating public opinion on the then unrealized possibilities of gas-cookers, exhibitions were held from one end of the country to the other, coupled with schemes for canvassing and interviewing. At one time there were over a hundred canvassers working in conjunction with the gas undertakings.

In 1898, a complete show-room and maintenance scheme was initiated by the Company. They undertook the opening of show-rooms and the running of the distribution side of a gas undertaking, including the supply and fixing of all gas apparatus; their remuneration being partly based on a percentage over and above a given gas consumption. In 1901, they opened show-rooms under this scheme at Plymouth, Bournemouth, Boscombe, and Dublin; and they were eventually taken over by the Gas Companies interested. Their experience of maintenance work in these

towns showed them the desirability of periodically inspecting gas-cookers, fires, &c.; and in 1903 they advocated this policy, training a staff of men who went to many parts of the country on behalf of gas undertakings. In 1901, the meter businesses of Messrs. George Glover & Co. and Messrs. George Newton & Co. were acquired; and in 1909, the resources of the Company were further extended by the purchase of the business of Messrs. S. Clark & Co., the patentees and manufacturers of the well-known "Syphon" heating stoves. Richmond's first London show-rooms were opened in 1895, in a small shop at the corner of King Street and Cheapside. A very few years, however, sufficed to take them to larger premises at No. 132, Queen Victoria Street. By gradually acquiring more floors in the building, this accommodated them until last year, though, had the war not intervened, they would have made an earlier removal.

On the present premises becoming vacant, they were immediately secured; the attraction attaching to remaining in Queen Victoria Street, where they had been established and well-known for so long, being strongly recognized. The West-End of London has for long had its fine gas show-rooms, including those of the Davis Gas-Stove Company in Oxford Street; and the establishment of modern gas exhibitions in the heart of the City (the centre of the world's commerce) is in the best interests of the industry. These show-rooms represent the latest ideal in the display of all types of up-to-date gas appliances in actual use.

Speaking of the site of these new show-rooms, with its old associations, naturally led Mr. Thornton to take a peep into history; and he gave his audience some very interesting notes on this subject, going right back to the time of the founding of the Black Friars in 1221. It seems somehow almost incredible that, as we were told, only fifty years or so ago cottages and dwelling-houses, with a few small shops, stood where the fine buildings of Queen Victoria Street and New Bridge Street now stand. There was then no road known as Queen Victoria Street.

Development of "Richmond" Heating and Cooking Appliances.

Mr. Thornton then turned to another phase of his subject—the stages passed through by the manufactures of the Company in the past thirty years. He selected for this purpose representative pieces of apparatus which mark definite points of progress—land marks in the industry. It is, he remarked, difficult to realize the progress that has been made in gas-consuming appliances within a very few years. It would doubtless be no exaggeration to claim that no other industry has made greater advances in such a comparatively short space of time. Only 29 years ago the firm introduced the first gas-cooker which had loose burners and all wearing parts removable. These removable burners are such a commonplace to-day that it hardly seems credible that cookers were ever made differently. Then in 1892 came the first white enamel crown-plate; and the following year witnessed the introduction of a complete series of "slot" cookers, together with the Company's campaign to prove the wisdom of universally fitting them to prepayment meter installations. Passing quickly over the years, and coming down to more recent times—say, twelve years or so—the introduction of the "A.B.C." series of gas-fires would probably be within the memory of many. This was the first series of gas-fires that rendered simple hire easy and profitable, inasmuch as, while three different designs were provided, the whole of the wearing parts of each fire—burner, brick, fuel, &c.—were exactly similar, interchangeable and standardized. Having thus solved the problem of gas-fire hiring, with a series of fires cheap enough for the small consumer, attention was turned to the high-grade gas-fire for the larger house; and in recent years the famous "Period" series was evolved, which, for correctness of architectural design, beauty of outline, and quality of finish, still stands supreme, and is being added to by fresh designs each year. The same principle of standardization and interchangeability obtains as in the earlier series. The "Period" series set the standard of design—particularly in the direction of cutting-down the excessive cast-iron work at the sides of the radiant fire-front. Typical installations illustrative of "Period" gas-fires, set in artistic mantels, showed their suitability for the most artistically designed and furnished apartment, and demonstrated how the modern gas-fire can take its rightful place in the architect's scheme of decoration, for which the fireplace is often the foremost attraction.

In the spring of 1914, the firm's laboratories produced the "Economic" gas-cooker, which they claim to represent the first successful attempt to improve the thermal efficiencies of cooking by gas. The boiling efficiency of the hotplate, which is the part which has most use, was increased materially. There have been further developments recently; and more information will be available shortly, when the standard cookers are placed on the market.

The year 1915 marked an epoch in the construction of their gas-fires by the introduction of the patent "R.H.D." (radiant heat distributor). This was a definite departure from standard practice; and the results have warranted the innovation. The patent consisted chiefly of a semi-circular fire-front, which gave an area of radiant heat distribution far in excess of anything previously or since achieved. Coupled with this uniform distribution of radiant heat was the minimizing of the loss of heat through the cast-iron back of the fire. By the special construction of the "R.H.D." fire, the area of the back-brick was reduced by over 33 p.ct., and a corresponding saving of heat loss was achieved. There were several other novelties introduced; and the net result showed a much higher efficiency. The war prevented further developments of this fire; but it has been such a marked success that one fresh design incorporating the principle has been introduced this winter—viz., the "Westminster."

In water-heaters, the Richmond Company can claim to be the first to propound the value of the principle of vertical heating surfaces, minimizing the formation of deposit, and preventing loss of efficiency. It is this principle, coupled with simplicity of construction, which has made the "Ironclad" circulator so popular. As to geysers, the policy adopted when the firm introduced these was perfect accessibility for inspection, cleaning, and repair. In 1910, the Company first seriously attacked the important subject of the use of gas for industrial purposes; and the series of natural draught furnaces quickly made their name in this direction. To-day "Richmond" furnaces are as well-known in the engineering world as are their cookers and fires in the domestic sphere; and over 5000 are in use in one town alone.

The Policy of Radiation, Ltd.

The concluding portion of Mr. Thornton's lecture was as follows:

Having now given a very brief general survey of the history and progress of the Company and its manufactures, I would like to say a few final words on the present position. On the termination of the great war, it was natural for gas-stove makers to take stock of their position, and lay their plans for the future. With the lessons of the success of national unity taught us in war time, it was natural that one's thoughts should turn to the possibility of closer working between the large gas-apparatus manufacturers. Was the old policy of competition to continue, or did the principle of co-operation and an amalgamation of interests hold the greater possibilities of success to our own industry, and usefulness to the greater industry we serve? Was it possible for the progress we all desired to be achieved if each firm continued to work independently? While it would be incredible if I were to claim that we regarded solely the interests of the gas undertakings, yet I do say that it was strongly recognized that only by a union of manufacturing, research, and commercial resources could we carry out schemes of reform that had long been desirable, prevent prices rising unduly (and we hope eventually reduce prices), and present to the industry the most efficient and most economical appliances it was possible for modern applied science to produce.

I claim, further, that by recent announcements—I here refer to Radiation standardization policy—we have justified the existence of Radiation, Ltd., judged by this achievement alone. For the first time in the history of the industry, you have the five largest gas-stove manufacturers offering a series of gas grates—fifteen distinct designs in all—all with the renewal and working parts identical and interchangeable. This must be acknowledged to be a tremendous advance. It gives the consumer a sufficiently wide range of choice to satisfy all possible requirements, while it enables the gas undertaking to offer this wide range of choice without the embarrassment of having to stock a very large number of parts and consequent heavy cost of maintenance. You are probably all so familiar with the confusion and expense entailed by the huge stocks of parts—fuel, bricks, burners, fittings, &c.—you have had hitherto to collect, store, and catalogue, that I am sure it is unnecessary for me to elaborate the advantages which this policy represents and inaugurates.

This is only a beginning. Every fresh gas-fire that is placed on the market by any of the five firms associated with Radiation, Ltd., will in future be composed of these standardized parts. In a comparatively short time, therefore, it will be only necessary for one set of parts (in the respective sizes) to be stocked for the whole range of fires made by the associated gas-apparatus manufacturers. Announcements have already been made of some important additions to the initial fifteen fires I have just mentioned, and others will follow very shortly. Further, we are standardizing wash-boilers, boiling-burners, high-grade cooker hotplates, and last, but by no means least, the slot-cooker. This, perhaps the most important part of our programme, has not been an easy problem to solve. But it is now in process of completion, and it is hoped to be able to launch it shortly.

Now, it cannot be denied that these represent solid and substantial contributions to the future of the gas industry. The coming years hold promise of very great things; and when conditions become more nearly normal, and circumstances permit of forward steps, we shall see the achievements of the past, weighty as they have been, greatly surpassed by the developments that will be made and the wider scope of gas utilization that will ensue. We believe we have, by this action in co-ordinating our activities, uniting our facilities for research, and combining our manufacturing resources, strengthened the position very considerably, and appreciably assisted towards securing for the industry as a whole that position of supremacy which is its due. When all things are considered in their proper relations and perspective, the interests of the gas industry and ours as apparatus manufacturers are mutual, and interdependent. Progress will largely depend on co-operation the one with the other. Given that, and a recognition and sympathetic understanding of the points of view of both sides, I believe that we shall witness an era of wider success and greater prosperity than our industry (of which we are all so proud) has ever known. To that success and prosperity, I feel sure your Association is destined to contribute an important part.

THE NEED FOR CO-OPERATION.

The PRESIDENT (Mr. Frank J. Pearce, of the North Middlesex Gas Company) said they were deeply indebted to Mr. Thornton for his lecture. Looking back, it seemed almost incredible that from so small a beginning the Company should have grown to the immense concern it was to-day. They were very grateful for the excellent manner in which they had been entertained.

Mr. G. H. LLOYD (Gas Light and Coke Company) proposed a hearty vote of thanks to the firm, coupling with it the name of Mr. Thornton, their able Managing-Director, and the members of the staff, for everything they had done for them.

Mr. W. L. WESTBROOK (North Middlesex Gas Company), who seconded, declared that the firm had always been in the forefront of progress. For many years he had admired the way in which their advertising had been carried out. By the aid of the pamphlets relating to the "Period" series, one had practically sold the fire before the consumer saw it. Mr. Thornton had said he hoped to be able to reduce prices. This was what was wanted all round. But before prices could be brought down, they must have co-operation.

Mr. W. J. LIBERTY, supporting, said he had known Mr. Thornton for many years in the City of London. He was a man of boundless energy, and was for a long time an honoured member of the Corporation. They were very delighted to be at this "housewarming."

Mr. THORNTON, in acknowledgment, said he knew the vote was sincere, and he could tell them that it had given the Company a tremendous amount of pleasure to see them there. They had talked about what the firm had done, but were not forgetful of what the Association were doing. Co-operation was the essence of the whole matter. He could assure them that the policy of Radiation, Ltd., was to get prices down at the earliest possible moment. This was their deliberate policy, when national affairs would allow of its being carried into effect. "Wait patiently," he added, "and I firmly believe you will bless the day when Radiation, Ltd., was formed."

Mr. J. F. WICKS was called upon by Mr. Thornton, and returned thanks on behalf of the staff. He said that, without having any authority to do so, he would like to suggest that the Richmond Company should present to the Association an illuminated list of Presidents, Secretaries, and other officers from its inception, so that the names of those who had done so much to make the Association the success it was to-day might be prominently displayed, as they deserved to be.

Mr. THORNTON promised that, with the consent of the Association, this suggestion should have cordial consideration. He also announced that a souvenir brochure was being prepared, and would be sent on to each member, to commemorate their afternoon's visit.

MIDLAND JUNIOR GAS ASSOCIATION.

A Meeting of the Midland Junior Gas Association was held on Thursday evening last at the Birmingham Council House—Mr. W. J. PICKERING in the chair. There was a representative attendance of members.

The PRESIDENT extended a hearty welcome to a number of new members; and subsequently a letter was read from the Senior Vice-President, Mr. W. Batt, of Stoke-on-Trent, apologizing for absence, and stating that he was leaving the district to be Assistant Distribution Engineer at Newcastle-upon-Tyne.

The SECRETARY (Mr. B. J. Bell) was authorized to send to Mr. Batt a letter of congratulation.

Mr. PICKERING then read the following paper:

WASHING AND SCRUBBING PLANT.

The section of the works' plant designed to remove ammonia from the crude gas is very important, and should be carefully supervised to obtain the highest efficiency possible.

The yield of ammonia from coal is commonly stated as so many gallons of 10-oz. liquor per ton; and even a good yield—such as 40 gallons per ton—implies only about one-fifth of the total nitrogen in the coal. This emphasizes the need for the careful extraction of the ammonia in the gas-stream; and in this connection the policy which still obtains at some works, of allowing ammonia to the extent of about 20 grains per 100 c.ft. of gas to pass forward to the oxide purifiers, in order to assist the working of the latter, is bad practice. It may achieve, and undoubtedly does, a temporary increase in the activity of the material by neutralizing its acidity; but the life of the oxide is reduced in the long run by the formation of insoluble cyanide compositions of ammonia. Apart from this, there is a distinct drop in revenue by reason of the ammonia thus lost.

A better method of reducing the oxide acidity is to water the material, when spread-out for revivification, with a weak solution of commercial soda ash (Na_2CO_3).

Having thus established the need for efficient working of the ammonia extraction plant, I want chiefly to deal with the methods conducive to effective working in this respect, and aiming at the same time at making a good strength liquor for sale.

The plant for ammonia removal, on the ordinary gas-works coal-gas stream, consists of strong liquor washers and weak liquor or "finishing" scrubbers. There are many types of apparatus in both these sections; and most of us are familiar with the more general apparatus found on old and modern works—from the bulky tower scrubber to the latest type of vertical centrifugal machine. Mr. W. H. Johns (one of our Past-Presidents) gave a very comprehensive paper some years ago, with constructional details of most of the known makes of washers and scrubbers.

In the strong liquor washer section, the Livesey type has merited its almost universal use. It is static and efficient; and if well flushed-through with moderately strong liquor, it should effectively retain all traces of tar still remaining in the gas.

In the "finishing" scrubber section, there is, I think, no more efficient apparatus than the modern horizontal brush-machine; and, if properly looked after, this should "clean" the gas and also make good strength liquor.

On account of its lower cost and the small ground space taken up, the vertical centrifugal scrubber is installed as a "finishing" apparatus on many large works; and while it is capable of giving a high efficiency, one must be prepared for only weak liquor to be made.

The chief points in the efficient working of washers and scrubbers are, in my opinion, the following.

CLEAN WATER SUPPLY TO THE GAS OUTLET END OF THE FINISHING SCRUBBER.

It is fairly well established that water of as low a temperature as can be obtained on the works should be used; and a convenient method of regulating the supply is by means of a "constant head" and calibrated jet feed. This is better than attempting to regulate a water tap—no matter in whose hands the regulation is left.

Difficulty is experienced in some works in obtaining cold water during the warmer weather; and, where deep-well water is not available, a good plan is to pump the small amount of water required from near the bottom of one of the gasholder tanks, where the temperature will usually be a little below 50° Fahr.

THE "WORKING UP" OF WEAK LIQUOR.

Liquor should not be run to the well until strong enough for sale. Weak liquor from the finishing scrubbers should be fed to the primary washers, and the strong liquor from these run through the strong liquor washers (like the Livesey) before running to the well.

Let us consider a complete unit of plant capable of dealing with (say) nearly 5 million c.ft. per day or 200,000 c.ft. per hour actually, consisting of a Livesey washer, a primary washer, and a finishing scrubber. The gas at the Livesey washer outlet will contain about 120 grains of ammonia per 100 c.ft.; and at the inlet of the finishing scrubber this should be reduced to about 40 grains per 100 c.ft. If we work out the quantity of water required to be supplied to the final scrubber, to reduce the ammonia passing to 2 grains or less, and make 4-oz. liquor at the outlet, the figure is 125 gallons per hour. If the whole of this weak liquor is then put through the primary scrubber, where a further 80 grains of ammonia per 100 c.ft. are washed-out, the strength of liquor at the outlet works out at 12·4 oz. Allowing for some loss in strength, due to water condensed from the gas, it will be seen that strong liquor can easily be made by working in this way; and if the whole of the liquor be now run through the Livesey washer, the strength will be further increased.

Regular tests for the liquor strength and the ammonia content of the gas should be made, to permit of proper control.

IMPORTANCE OF THE CONTACT AND MAXIMUM AREA OF WETTED SURFACE EXPOSED TO THE GAS.

As in other gas-works' processes, the factor of "time-contact" is all-important as regards the scrubbing plant; but this should be considered in conjunction with the area of wetted surface exposed to the gas. A short length of washer may be more efficient than one of greater length, in which the area of wetted surface is smaller. The efficiency of spraying in certain types of vertical scrubbers is a doubtful quantity; and the speed of rotation of the spraying devices is all-important. If the spray be very fine, quite an appreciable quantity is carried out of the apparatus by the gas-stream; and modern practice in chemical works' acid-washing towers—where the spraying method was at one time universal—is periodically to flood the apparatus with the washing liquor, so as to ensure that all surfaces are freshly wetted, when the "film action" absorption process goes forward with maximum efficiency. Very good results can be obtained with a static washer in which the factor of wetted surface is relatively high, with only a very small time-contact at normal gas capacity rate of liquor circulation or supply, provided the latter is sufficient to change with proper rapidity the film liquid on the wetted surfaces. Our old friend, the horizontal rotary brush scrubber embodied this principle, which accounts for its uniformly excellent results and its almost universal use.

DISCUSSION.

Mr. H. W. DEAN (Birmingham) was quite in agreement with what the President had stated. But one important factor to which he had not referred was in relation to ammonia removal during condensation. His experience, he said, was that ammonia washers were often troublesome by reason of the naphthalene deposited in the clean water scrubbing apparatus. An excessive back-pressure—sometimes up to 12 inches—was thrown by them, probably through this deposit of naphthalene. In his judgment, the ideal plan was to have a Livesey washer followed by a "Standard" horizontal scrubber; and he thought

that the Kirkham plant could be made to "clean" the gas down to a 2-grain limit.

Mr. C. F. W. RENDLE (Redditch) emphasized the importance of the effective recovery of ammonia from the economic point of view. One objection to the horizontal brush type of washer was, he said, due to its liability to become "made up" with naphthalene and tar. Its action might easily be nullified in consequence. Another objection arose from the fact that the washer took up a good deal of ground space. The importance of freeing gas from tar could hardly be exaggerated; and he thought it was wise to attempt this without relying too much upon the Livesey washer.

Mr. T. H. POULSON (Stafford) pointed out that the gas from the condensers possessed a great amount of heat which could be utilized for other purposes. Much waste heat was lost by not taking advantage of the water for the primary condenser, and using it for boiler-feeding purposes. By adopting this method, they were saving on fuel at Stafford £500 per annum. Rotary washers were generally driven by steam-engines. To his mind, steam was wasteful; and he thought that as gas engineers, where there was a steady continuous run, it would pay to drive such machines by gas-engines. Referring to plant for working-up ammoniacal liquor into ammonium sulphate, Mr. Poulson showed the members samples of the salt made at Stafford by the South Metropolitan Gas Company's process.

Mr. RENDLE further observed that the power-driven ammonia machines were liable to the breakdown of motive power; but this was not the case with the static machine. He agreed that there was frequently considerable loss by the use of the steam-engine, owing to stoppages due to the wearing-out of the metal bearings. Gas-engines, too, were liable to interruption in working; and his suggestion was that the best drive was the electric motor, with current generated on the spot.

Mr. T. A. HARVEY (Birmingham) observed that the sulphate produced at Saltley was obtained directly from Mond gas, by passing the latter through a horizontal washer worked with sulphuric acid. By the use of one washer, it was possible adequately to remove all the ammonia from the gas. The means by which sulphate was recovered from the liquor was by an ordinary vacuum evaporator and centrifugal drying machine. Though the crystals obtained were not very small, they were nevertheless quite suitable for use in an agricultural drilling apparatus.

The PRESIDENT replied briefly to the discussion. As to the tar nuisance arising from the use of horizontal scrubbers, his answer was that tar should not be allowed to get so far forward in the stream of gas. If the "P. & A." type of tar extractor was installed, and properly looked after, such extractors were generally very effective. Interesting experiments made in the use of the static type of scrubber showed that as high efficiency could be obtained as with machines of the centrifugal type. It was possible to get proper extraction of ammonia from gas simply by the Livesey washer and two static washers—one as a primary and the other as a finishing scrubber. The direct method of ammonia extraction had, of course, certain points in its favour; but it was hardly applicable to ordinary gas-works plant. The best method of gas-works practice was, he thought, that adopted in the liquid purification scheme, where the liquor made was distilled to obtain ammonia for the removal of H_2S and CO_2, and ultimately disposed of as sulphate of ammonia, liquid ammonia, or other compounds.

Mr. A. HILL (Birmingham) read a paper on

POINTS IN GAS-FITTING IN THE NEW HOUSING SCHEMES.

Of the many after-war problems, that of making good the enormous shortage of dwellings all over the country is one in which all are interested. For us it possesses especial interest, for the occupiers of these houses will be gas consumers. The satisfaction which these consumers will derive from their gas installations will depend to a large extent upon the manner in which the internal piping has been carried out. It is important, therefore, from the point of view of people like ourselves, that adequate provision shall be made for gas in the new houses.

The carcassing of new houses usually falls on the builder who employes a gas-fitter or plumber to do the work. The two most interested parties are the gas consumer and the gas supplier. The consumer, unless he is actually having the house built, has no say in the matter at all. Even if he is paying for the house to be built, he will most likely overlook the question of gas supply pipes, or leave it to the architect. The gas supplier, unfortunately, has no authority to insist on adequate supply pipes being fitted. In Birmingham, since the armistice, we have prepared a specification for the internal piping of dwelling houses, and revived the practice of calling upon architects and builders with reference to the installation of gas supply pipes. In addition, a system has been instituted whereby the service pipe over private ground is laid up to 30 ft. to each house in which the internal pipes conform to our specification. The jobs are visited and inspected before the floor boards are laid. Up to Sept. 30 last, the number of houses which we were unable to pass was equal to 8½ p.ct. of the total carcassed and inspected. Among those not passed were some fairly good fit-ups, but not to our specification.

As the object of this "paperette" is to promote a discussion, I have selected one or two points in connection with the fitting-up of houses which are more or less debatable. The remarks refer chiefly to six-roomed houses. In the specification mentioned, all supplies are taken from a ¾-in. main which is laid from the meter position to the cooker. To run separate heating and lighting supplies no doubt possesses advantages; but cost is an important item which must be considered. The pipes are very accessible under the chamber floors, and in many new houses the downstairs rooms have solid floors.

The British Commercial Gas Association instructions for carcassing specify ⅜-in. pipes to pendant positions. Our specification requires that no pipes of less than ½-in. diameter are to be laid horizontally under floors. Some, no doubt, will consider this unnecessary; but it should be remembered that the length of pipe involved is comparatively short, and the efficient life of the installation is lengthened by the use of the larger pipes.

A house nowadays rarely has a cellar; and it is often difficult to decide exactly the best place for the gas-meter. The rules in Birmingham forbid the laying of a service pipe under the house. This often disposes of one or two otherwise suitable positions. If there is sufficient space, a box on the front wall in the hall is generally satisfactory to all concerned. In Corporation houses, and others of similar types, the meter is sometimes put in a box in the corner of the living room. This is the largest room; and the space taken up is not so noticeable. The position enables the service to be terminated as soon as it enters the building, and in some cases allows of a joint service being laid to two houses where the meters come back to back with a party-wall between. Most of the meters being fixed in these houses at present are slot meters. The position is a safe one, and is convenient for the consumer and for the inspector. The usual objection to the meter in the living room is on æsthetic grounds; but if the meter is boxed in, one might as well object to a music cabinet or a cupboard. A real drawback is the odour which may arise if a wet meter is fixed; but this may be obviated with a little care.

There appears to be no small difference of opinion as to the correct size of meter to instal in certain cases. Some will find the total possible consumption, and take two-thirds of this as the meter capacity necessary. Others apparently cater for the whole of the apparatus being in use at the same time. This matter is rather important, as a meter represents so much capital outlay; and it is bad business to supply a meter larger than is really necessary. The number in family, whether the gas-fires are downstairs or in bedrooms, &c., are factors which count. It is only reasonable to suppose that when the wash-boiler is in use lighting and gas-fires will be out of use, although the cooker may be required. Here is an example. A house is occupied by man and wife and one child. There are seven lighting points, gas-fires in parlour and one bed-room, cooker and wash-boiler in scullery, and a gas water-heater for bath and sink. I will leave you to discuss the size of meter required.

Shall we put a pendant position or a bracket position in bedrooms? This point has been treated by some as though it were a foregone conclusion that the pendant is better—apparently because the electric people use it. After all, the consumer is the final arbiter in the matter; and brackets will be his choice in four cases out of five, after the alternatives are explained to him. It may only be conservatism, but there it is. In most cases it is impossible to consult the consumer before the carcassing is done, and so brackets are arranged for as being more acceptable and cheaper to instal. The position is selected usually by the side of the window, having regard to the probable position of the dressing table.

The fixing of brackets to ash concrete walls and partitions bring forward the question as to whether it is necessary or advisable to have these walls plugged with wood. It is not easy, judging by some attempts I have seen, to make a good job of a wood plug in this material; and having regard to the fact that the material itself is sometimes used by builders instead of wood for the nailing of door jambs to, should we not nail or screw the pattress block on to the wall or partition itself? Nails make a better job, as screws, if not carefully driven, will strip and lose their hold. In fixing cisterns, the plumber nails his boards direct to breeze concrete walls. Whenever it is possible to arrange it so, brackets are fixed back to back, one on each side of the same partition, with one supply to both and a tee at the top.

The height of brackets is laid down in the specification to be 6 ft. to 6 ft. 3 in. This presupposes that inverted brackets will be used, in which case the mantle will come in a suitable position. In our slot installations we are using inverted fittings—the gas is unsuitable for flat-flame lighting. Suppose the consumer cannot afford to buy inverted burners? In any case the positions can only be left at one height. What should this height be?

A feature of the new houses is the height of the ceilings—8 ft. In fixing an inverted pendant, if the bottom of the globe is to be 6 ft. from the floor, then the pendant required will be 1 ft. 3 in. or 1 ft. 2 in. long. In this length, there has to be a ball-joint, lever cock, and nosepiece. The mantle will be about 21 in. from the ceiling, and the necessity or otherwise of a ceiling protector is a matter which could be discussed.

In the first blocks of Corporation houses, we used to have bracket positions left on the chimney breasts in the parlours; but after a little experience we now arrange for pendants in these rooms. The breasts are not wide enough to accommodate two brackets with an overmantel between; and it was difficult in any case to get a good job made. The rooms are very small, and it seems doubtful if the tenants who are taking these houses would ever make use of both positions.

In this carcassing work we are dealing mostly with outside gas-fitters and plumbers, and our instructions have to be uniform and simple. Where a pendant position comes between two joists, it is recommended that a tee be used with the centre for the drop, and the pipe carried on to the next joist and capped. If the fixing of wood bridging-pieces were insisted upon, the results would be far less satisfactory than from the above method.

How shall we have the pipes left so that they will be most convenient for the man who has to fix the apparatus? Something

has to be laid down in the specification as to the height from the floor of the cooker supply. We have put this as 3 ft., and the wash-boiler 1 ft. 6 in. For gas-fires it is rather difficult to specify in a general way where the supply pipe shall terminate; but it should be with an elbow looking up through a hole in a floor board, so that people may see that the supply is there. It is then a constant invitation to instal a gas-fire.

The attention of architects and builders in Birmingham has been called to the saving in building costs to be obtained by the use of special flues for gas-fires instead of the usual 9-in. brick flues. On our stand at the Trades Exhibition at Bingley Hall last March we exhibited a 4½-in. brick wall showing a 9 in. by 3 in. flue for a gas-fire constructed with special concrete blocks. A number of gas-flues have since been constructed in housing jobs; but in no case has the concrete block method been used. The methods actually adopted are either: (1) The using of a cavity in a wall divided off to form a flue; (2) cut bricks in 9-in. walls. An exception to this was in some brick bungalows. Here a 4½-in. partition wall was built with a wood core 9 in. by 3 in. placed where the flue was required. The space between the brickwork and the core was filled in with concrete, and the core withdrawn. Two such flues were constructed in the same wall—one for each fireplace in adjoining rooms. These flues terminated side by side at the top of the wall, and were gathered into one sheet-iron flue, which was taken through the roof.

With regard to the method of terminating these gas-flues. The method most favoured by builders is to construct the flue in an outside wall, and to simply leave an air brick under the eaves. In some cases, on our recommendation, a "Roventa" cowl* has been fixed, either horizontally or on a cast rain-water bend. The best job no doubt is to carry a gas-flue on through the roof as coal-fire flues are constructed; but this is exactly what most builders wish to avoid. As time goes on, and architects and builders give more attention to the question, we shall no doubt see developments in the construction of gas-flues. Present prices, unfortunately, tend to cause the selection of the cheapest methods and not the best.

DISCUSSION.

Mr. W. E. CADWALLADER (Birmingham) spoke in favour of the introduction of two pipe supplies—one for lighting purposes and the other for cooking and fires—in houses even of the cottage class. By this means, interference with pressure would be to a great extent obviated, as well as inconvenience to the consumer if pipe corrosion occurred.

Mr. A. WHITEHEAD (Birmingham) observed that in Birmingham they were somewhat handicapped by reason of the fact that builders from other towns were engaged upon housing schemes. It was a fact that in some towns the gas-fitter was not held in such high esteem as in Birmingham (in the North of England gas-fitting was frequently done by a plumber), and supervision, making for efficient piping, was less satisfactory. A good deal of the spade-work, on the educational side, that had been done was for the reason mentioned not productive; and it was having to be continued. There would be difficulty in providing two separate supplies in the general run of houses now being erected under the local housing scheme. One difficulty arose from the fact that there were no basements. A ¾-in. pipe as a minimum, continued to the kitchen, ought to be adequate. In bedrooms, the bracket position was preferable, because the tenant could more easily arrange the positions for his furniture than with a pendant. It occurred to him that there was in concrete flues the danger of cracking, in which event repair work would be very costly. The better type of flues would, he thought, be by the formation of a cavity in the bricks.

Mr. R. J. ROGERS (Fittings Superintendent of the Birmingham Gas Department) urged the necessity of all gas undertakings adopting a standard specification for pipe-services. It was surprising that there was no bye-law in connection with local authorities to insist upon gas-fitters or plumbers putting into houses gas-pipes of adequate size. In the United States and some Continental countries this was a legal obligation. The question was one that was sure to come forward, in view of the steps that were being taken by the industry in urging the necessity of gaseous fuel instead of solid fuel. In giving evidence recently on the subject of smoke abatement, he strongly urged this matter; and it was obvious that, if legislation were adopted compelling the use of gaseous fuel, then the pipe-services must be of adequate dimensions. In Birmingham, they were fortunate in getting builders to adopt their standard specification. They gave a free service up to 30 ft., and 92 p.ct. of the houses built were supplied with this specification. The "B.C.G.A." had suggested a ⅜-in. pipe; but his view was that a ½-in. pipe should be the minimum for putting under floor-boards. Many of the houses now being erected were situated some distance from the mains; and it was costly to run a service to each house. The cost of such work was five or six times more than before the war; and so, where possible, he advocated the laying of a joint service. This plan had been successfully adopted in Birmingham; but it was necessary, of course, to show this fact clearly on the pipes, for the guidance of fitters who might come along in the future. A "service badge" had been adopted, which at once pointed out to the fitter the need of turning-off the gas in the next house before starting to clear the service. As to meter capacities, he thought a 2-light meter was generally adequate; for with a 5-light size dry meter, 200 c.ft. an hour could be passed through hourly. There would, of course, be a great reduction of pressure; and one would not in the ordinary way fix a 5-light meter to pass that quantity of gas. It was very rare in an ordinary villa that all the services in the several rooms would be required at the same time. Owing to the limited height of rooms in the newer class of houses, it would be necessary to maintain the bracket position. Many authorities were considering the question, Mr. Rogers said, of adopting electricity in new cottage property, mainly from the point of view of economy in interior decoration cost. The Birmingham Housing Committee had recently adopted a resolution in favour of the installation of electricity where electric mains were available, although the initial cost would be £4 or £5 more than gas cost; the main consideration being on the score of decoration in the future. So far, however, none of the houses erected under the Birmingham Housing Scheme had been equipped with electric light; but the possibility had to be recognized. Having regard to the present type of houses now being erected, they were obliged to adopt the system of taking the supply through the chamber joists for the gas-fires and for lighting, mainly from the point of view of economy and partly from the fact that they could not run underneath the ground floor. In the better class of house it was undoubtedly preferable to run a separate supply for heating and cooking, and a separate one for lighting. But each case must be considered on its merits. As to flues, they had had in Birmingham a fair amount of experience, which had taught them that when the wind was in the direction of the wall in which the air-brick was fixed, they had a down-draught. A great deal had been said with regard to concrete flue-blocks for gas-fires. He did not agree to the discharge of flue products into the roof space. If the gas-flue could be taken through the party wall, and carried on through an earthenware pipe into a permanent brick-flue, the one-brick chimney carried off all products.

Mr. L. STURDY (Birmingham) said he looked forward to the day when they would have a combination range for gas and solid fuel. He thought many would welcome the provision of a kitchen bracket, near the window, which would facilitate the use of gas for ironing. His view was that a single supply was generally adequate.

Mr. S. W. SIMMONS (Dudley) emphasized the importance of having supply pipes of sufficient size. They had a specification of ¾-in. pipes, and ½-in. on the horizontals; and they then tapered down to ⅜-in. The meter should be fixed as near the front of the house as possible.

Mr. J. H. DAVIS (Birmingham) thought a position under the staircase was the most suitable for a gas-meter; for it afforded practical immunity from frost and naphthalene. He favoured bracket positions in bedrooms.

The proceedings terminated with a vote of thanks to the authors of the papers read.

* A description of this cowl appeared in the "JOURNAL" for Oct. 27, p. 210.

SILENT AËRATED FLAMES.

By HAMILTON DAVIES, B.Sc., Chief Chemist to Messrs. Wilsons and Mathiesons, Ltd., of Leeds.

[Abstract of a Lecture to the Yorkshire Junior Gas Association, Oct. 16.]

The question of flame noise, said the lecturer, was of interest to gas engineers on account of its importance in connection with gas-fire burners. An old type of gas-fire burner was shown; and it was demonstrated how, when the primary air supply is progressively increased, the flames roar or rattle. It was pointed out that the noise—which was unpleasantly noticeable—appeared to be due to the oscillatory condition of the tips of the inner cones.

This burner was contrasted with one of a more modern construction, in which a number of silent, steady, well-aërated flames are produced. Two explanations which had been advanced to account for flame noise were mentioned. They were:

1.—The mixture consumed was "streaky." Combustion was therefore irregular; and this condition produced flame noise.

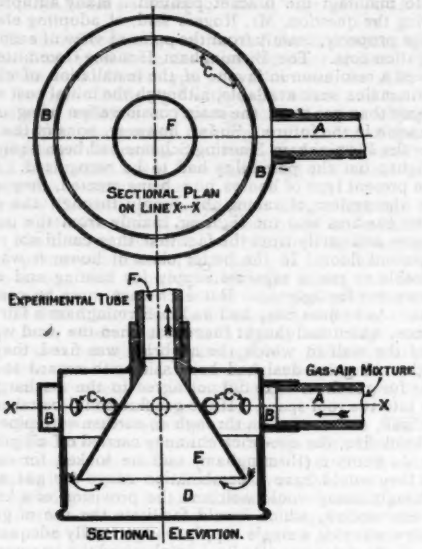
2.—Even if the mixture consumed was homegeneous, eddies were developed in the current of the mixture; and these eddies accounted for flame noise.

It was admitted that either of these conditions might cause an aërated flame to burn noisily; but it was thought that, even when they might be considered as eliminated, there were other factors which determined whether an aërated flame would, or would not, burn silently.

The apparatus employed to obtain the data quoted in the lecture was described. Separate supplies of coal gas and air, both under pressure, were passed through two standardized test meters. After passing through the meters, the supplies were led through a single mixer, consisting of a metal cylinder 10 in. by 2½ in., packed with rolls and discs of gauze. In this manner, perfectly homogeneous mixtures of gas and air in any desired proportions were obtainable.

As a preliminary, it was decided to study the behaviour of single flames burning from tubes of various lengths and cross-sectional areas. It was emphasized that a standard method of supplying a gas-air mixture to such an experimental tube was essential. The type of supply chamber finally decided on and used in all the experiments quoted was described. This is shown in sectional elevation and plan.

It was found that for a single tube flame noise depended on the degree of aëration and rate of consumption of the mixture. The transition from a noisy to a "just-silent" flame was described; and it was mentioned that, with the particular coal gas employed, the consumption, corresponding to the production of a "just-silent" flame, rose to a maximum when the percentage of coal gas in the mixture was approximately 27 p.ct. The results of a typical experiment, in which a ⅜ in. brass tube (0·302 in.



Supply Chamber.

internal diameter), 12 in. long was used, are shown in Diagram No. 1. A similar maximum point was found for a ¼-in. brass tube (0·432 in. internal diameter), although the actual consumption was greater.

Adopting this mixture as a standard, the consumptions producing "just-silent" flames for various lengths of tube of the same internal diameter were determined. These consumptions (after an initial maximum point was passed) increased as the tube length was increased, until a "critical-length" was reached, after which increase in tube length did not permit of increased consumption.

The results obtained with various lengths of ½-in. brass tube are given in Table I., and are plotted in Diagram No. 1.

TABLE I.—*Conditions for Silent Combustion of a Gas-Air Mixture at Orifices of Different Lengths of ½ in. Brass Tube.*

Length of Tube.	Gas Rate.	Air Rate.	Mixture Rate.
½	5·70	15·45	21·15
1	5·85	15·95	21·80
2	5·75	15 75	21·50
6	6·35	17·50	23·85
10	6·75	18 45	25·20
14	6·95	19·00	25·95
20	7·45	20·50	27·95
48	8·55	23·40	31·95

Rates are expressed in cubic feet per hour at 15° C. and 760 mm. moist.
Mean percentage of gas in mixtures = 26·8 p.ct.

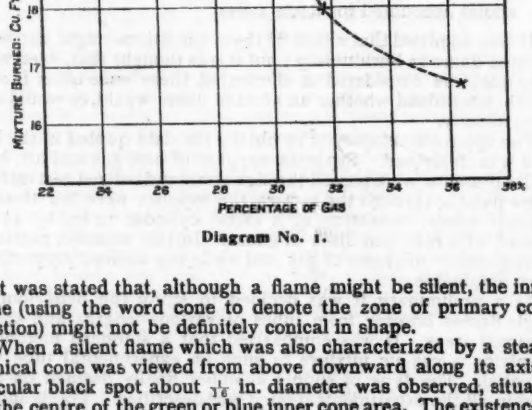


Diagram No. 1.

It was stated that, although a flame might be silent, the inner cone (using the word cone to denote the zone of primary combustion) might not be definitely conical in shape.

When a silent flame which was also characterized by a steady conical cone was viewed from above downward along its axis, a circular black spot about $\frac{1}{16}$ in. diameter was observed, situated in the centre of the green or blue inner cone area. The existence of this spot was explained as due to the different angle at which the tip of the cone was viewed compared with the sides. The stage at which this circular black spot, as contrasted with an irregular dark area, just appears, was proposed as a criterion for determining when a silent flame becomes steady—the word "steady" being used to denote a truly conical condition of the inner cone. The following definition was proposed: "A silent, steady, aërated flame is one in which the inner cone is everywhere bounded by a sharp line of demarcation, the flame, when viewed along its axis from above, showing the existence of a centrally disposed black spot."

Curve 2 in Diagram No. 2 shows the consumptions of the mixture containing 27 p.ct. of coal gas—producing silent, steady

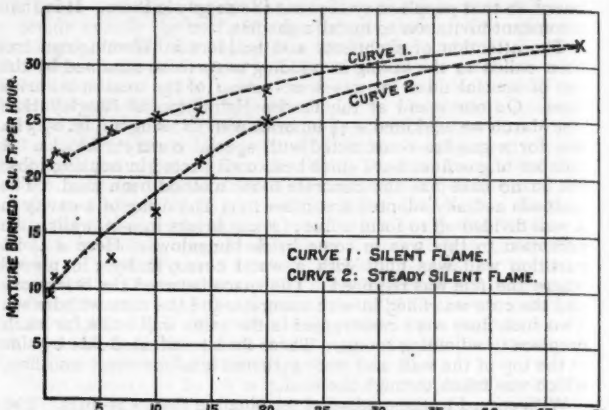


Diagram No. 2.

flames with various lengths of ½-in. brass tube. The curve meets the "just-silent" flame when the tube length is approximately 48 inches.

The relation between areas of flame orifice and consumptions for lengths greater than the critical lengths of tubes of different cross-sectional area, was dealt with. This relation is shown in Table II.

TABLE II.—*The Relation between Consumptions and Diameters.*

Length of Tube.	Internal Diameter.	Gas Rate.	Air Rate.	Mixture Rate.
	In.			
96	0·656	13·90	38·15	52 05
84	0·432	8·90	24·30	33·20
48	0·302	6·35	17·35	23·70

Ratio of Diameters.	Ratio of Consumptions.
$\frac{0·432}{0·302} = 1·430$	$\frac{33·20}{23·70} = 1·401$
$\frac{0·656}{0·302} = 2·172$	$\frac{52·05}{23·70} = 2·196$

It was clear therefore that consumptions were not proportional to the cross-sectional areas, but that the ratio of consumptions approximated closely to the ratio of diameters or internal circumferences.

GENERAL CONCLUSIONS.

1.—The noise of an aërated flame was not necessarily due to imperfect mixing of the gas and air, nor to the presence of eddies in the current of the mixture.

2.—The type of supply chamber used might influence the results obtained; but such influence, if any, appeared to be of the nature of a constant factor, and did not negative the validity of the conclusions drawn from a consideration of the data obtained.

3.—A flame produced at the orifice of a single tube by the combustion of a homogeneous gas-air mixture was noisy if a critical consumption depending upon the length and bore of the tube, was exceeded. This consumption rose to a maximum corresponding to a particular composition of the gas-air mixture.

4.—Considering this mixture, consumption increased as length increased until a critical length was reached, after which the consumption was constant.

5.—When lengths equal to, or greater than, the critical lengths of tubes of different diameter were compared, the consumptions producing the "just-silent" steady flames were not proportional to the cross-sectional areas, but were more nearly proportional to the diameters or internal circumferences.

It was suggested that the observations recorded, as well as others which had been noted, could be explained if it were assumed that the production of a silent well-aërated flame depended on a condition of differential velocity in the stream of mixture issuing from the flame orifice.

The differential value between the velocities of the central and peripheral streams was produced by the retarding influence of frictional resistance offered by the sides of the tube. Increase in tube length led to increase in frictional resistance.

When it was attempted to consume more than a certain rate of mixture at the orifice of a tube of given length and cross-sectional area, this differential value between the velocities of the central and peripheral streams was disturbed. An unstable state existed, and a flame resulted the tip of whose inner cone tended to oscillate spasmodically. If a considerable excess of mixture

were consumed, the oscillations of the inner cone tip became rapid and continuous, and a definitely noisy flame resulted.

This hypothesis was advanced as merely an expression of personal opinion; but it was urged that it received support from the observations quoted.

In conclusion, gratitude was expressed to Messrs. Wilsons and Mathiesons, Ltd., for the time and facilities granted to collect the data presented in the lecture.

DISCUSSION.

The PRESIDENT, in opening the discussion, observed that everybody engaged in the gas industry and come up against the problem of noise in flames, especially in household gas-fires. In furnace work, it was not of such moment. Mr. Davies' address had given many valuable factors which had influence on the question. How these factors would bear upon the difficulties was a matter for them all to study.

Prof. SMITHELLS said it gave him great pleasure to attend once more a meeting of the Yorkshire Junior Association, which had taken its being first at a meeting at the University seventeen years ago, and in which he had always been interested. He remembered that he had himself, years ago, been invited to give an address to the Association on a kindred subject—that of the bunsen burner. He was delighted to hear of the prosperity of the Association; and he hoped and believed it would be a pleasure always to them of the University to help in every way in the work in which the Association was engaged—of bringing science into closer relationship to every-day industry. He must say he felt rather grandfatherly when he addressed a gathering of which both the President and the lecturer were former students of the University. The subject of the address was of very real interest to himself; and he must congratulate Mr. Davies on the important investigations which he had conducted, and on the way in which he had put his results before the Association. One of the afflictions of the old gas-fire was undoubtedly the noise; and the suppression of the noise would be an important and necessary step in the utilization of these appliances in the future. He had followed with very deep interest the steps in Mr. Davies' investigations. He had himself taken a special interest in producing steady flames, but had been more concerned, perhaps, in the question of steadiness than of noise. For two or three years he had had in his laboratory a flame which he had got so steady that it looked more like wax than a live flame, and it was obtained, as in Mr. Davies' case, by having a particular length of tube—some 5 or 6 ft. long. When he had been speaking to him recently about his work, Mr. Davies mentioned that he had often noticed the dark spot when looking down the flame. He (Prof. Smithells) became somewhat alarmed, because he gathered at the time that Mr. Davies regarded it as being a vacancy. He could not bear to think that there was a hole in the flame which he had himself never noticed. [Laughter.] He was glad to note that day that Mr. Davies did not regard it as such, but that the black spot was an extremely thin layer of flame in comparison with the remainder of the area of flame. He must confess that he was not yet quite clear as to Mr. Davies' explanation of the oscillation when the flame was not steady. Mr. Davies ruled-out any theory of streakiness of gas and air, and of that there was no longer any doubt. He had also demonstrated that it was highly probable that it was not a question of eddies; but what it actually was he (Prof. Smithells) could not yet quite understand. It certainly must be some variation in the travel of the flame to and fro—a variation in the rate of combustion. Mr. Davies had made it probable that it was not variations in composition of the mixture; and therefore it seemed it must be variations in velocity. The address had set him thinking; and he hoped that at some time he might himself carry out experiments on the subject.

Prof. COBB said his own frame of mind, after hearing the paper, was very similar to that of Prof. Smithells. There was no doubt of the importance of this question, or that Mr. Davies had, by careful experiments and collection of results, put the meeting in possession of a number of facts which bore very greatly upon the matter. He could not, so far as he could see, say that Mr. Davies had constructed quite a clear and consistent theory on the subject; and perhaps Mr. Davies did not claim that he had done so. The rate of ignition was a fundamental of the problem. If the rate of ignition could be increased, it was possible to complete combustion of a larger amount of gas more quickly. How far did Mr. Davies' figures correspond with the figures which had been obtained from observation of the simpler phenomenon—the rate of ignition? Another point on which he was not quite clear as to what Mr. Davies meant was when, in his mention of the rate of oscillation of the tip of the flame, he spoke of the actual note sounded by the flame. Were they to understand from Mr. Davies that the oscillations corresponded with the oscillations of (say) a tuning fork, and that their number could be determined and found to correspond with the kind of thing they would hear when produced in some way other than by oscillation of a flame? The experiments seemed to him (Prof. Cobb) to require some further elaboration; and no doubt Mr. Davies had it in mind to do so.

Mr. DAVIES, in answer to Prof. Smithells' observations, said, of course facts were facts; but an explanation or a hypothesis was largely a matter of opinion. He very carefully said in the address that his results were as accurate as could be obtained; and he believed they would stand if submitted to any independent observer. Prof. Smithells had agreed (as, of course, everybody would) that in a steady flame they had a balance between rate of inflammation and rate of outflow. He (Mr. Davies) had referred to an unstable balance, which might be corrected almost at once. Prof. Smithells remarked that the noise of an inner cone must be due to eddies of changing velocities. He (Mr. Davies) looked upon it as having something to do with the differential velocity. In reference to Prof. Cobb's remarks, his explanation was merely a hypothesis; and he felt very honoured that, at any rate, he had caused such authorities as Prof. Smithells and Prof. Cobb some thought. If he ever had time, he hoped to go into the question of the rate of inflammation of coal gas. He was experimenting with Leeds gas; and he would try to find out if there was any co-relationship between rate of inflammation and the composition of the mixture with which he was experimenting. He would remind the meeting that in his address he had pointed out that his experiments and observations were to be regarded as a preliminary to more detailed experiment.

Dr. HARTLEY said, personally, he was inclined to believe eddies played an important part in the matter. Mr. Davies, doubtless, would agree that eddies could cause noise. He (Dr. Hartley) regarded this as some indication that streakiness of the gas was not the sole cause of the noise. It was conceivable that while still having turbulence they might not have noise; and he felt sure that any further investigations in the matter would be of great value. There was an enormous amount of data in the address which should be of good service to the industry.

Mr. HODSMAN, of the University staff, said, in regard to the black spot, he was not sure that the difference in the thickness of the shell of flame was quite sufficient to explain the spot. Some evidence had been brought forward, and could be found in chemical literature, that there was some chemical difference as well as the difference of thickness.

Mr. E. A. LEASK (Leeds) proposed a vote of thanks to Mr. Davies, and said he was sure a great deal of detail had been put into the experiments. This question of silence in the burners, as to how, when, or where it occurred, might possibly never be found out; but at any rate he thought gas departments would be content, while consumers were enjoying silent gas-fires. He wished silence could be adopted in such things as industrial air-blast appliances. It might be that the pressure was too high to have silent burning in these appliances; but it would be very desirable if it could be done. He was sure that when Mr. Davies' address was printed it would add considerable distinction to the "Transactions" of the Association.

Mr. W. HEATHCOTE (Halifax), seconding, said he confessed that he was a little disappointed that Mr. Davies had kept strictly to the scientific aspect, and did not touch upon the practical side. It was easy to see that he had done a great amount of work in arriving at his conclusions; and the industry was indebted to such gentlemen for the great number of silent gas-fires which were now on the market.

The PRESIDENT said they all appreciated the amount of work Mr. Davies had done to get material for the address, and though they were themselves engaged in the practical side of the industry, they were glad he had kept his remarks absolutely clear of gas-fires and the relative merits of rival types and makers. They recognized and appreciated the wisdom of his keeping strictly to the subject of flames.

Mr. DAVIES, in reply, said he had deliberately kept to the scientific side, because he was anxious to avoid all questions of what might be called rival commercial types of gas-fires. He wanted to give the benefit of a little piece of work—however little it might be—which might be of some scientific usefulness in furthering the progress of the industry.

Welding Water-Gas Generator Door-Frames.

Writing in the "American Gas Association Monthly," Mr. G. T. Macbeth, of Mount Vernon, says that, after some experiments, it has been found possible to weld water-gas generator cast-iron cleaning-door frames in place, with oxygen-acetylene apparatus. This is done by operating the generator up to the time when the welding is to be done. Open the door of the frame to be welded, rake-out all the dead fire, and draw sufficient red fire into the door-frame for pre-heating it. Do not pre-heat sufficiently to make the door-frame red hot. When the welder is ready to start, temporarily place asbestos sheets over the red coals after the frame is pre-heated. and proceed with the welding. When the welding is finished, close the door, and let the plant stand for approximately one hour, when it can be again operated. The first door-frame welding so carried out re-cracked, and had to be welded a second time; but since then the welder has gained sufficient experience to weld door-frames *in situ*, and make everything tight the first time, without the door-frames re-cracking.

Indicating Time for Water-Gas Makers.

Earlier this year, Mr. A. C. Howard, of the United Gas and Electric Engineering Corporation, New York, described in the "American Gas Institute Monthly" a new instrument for use by a water-gas maker in place of the ordinary clock. The instrument consists of the clock mechanism of a 12-in. "Bristol" recording gauge, speeded-up to make one revolution per hour, and fitted with a special chart framed by the Corporation; one chart being prepared for each plant, in accordance with the operating schedule. There was first drawn on tracing paper a 12-in. circle, divided into sixty equal parts, each representing a minute. From this tracing such a negative was made as would permit of a print of the desired colour being obtained. One of these prints cut out makes a suitable blank chart, and can be divided (by coloured spaces properly proportioned to the time of the operations) into blows, up-runs, and down-runs of any desired length. The one-minute divisions are for the convenience of the man drawing up the chart, and not for the gas-maker, who does not even know the length of his run and blow when operating one of the instruments. The pointer is set at the beginning of the cycle of operations, and then the man simply watches it, and operates the valves as it indicates. He has to be near the timepiece to read it accurately; but an approaching change can be seen from across the room, so that he does not at all times have to be close to the clock. This instrument renders it easy work for the gas-maker, because he has no report to fill up, and no time to figure out. The timepiece permits the use of shorter and more evenly-divided runs and blows, with subdivisions which cannot be made on an ordinary clock without such close watching on the part of the gas-maker that he becomes tired-out.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Price Per Therm and a Decimal Point.

SIR,—I see that my friend Mr. Bradfield has given notice in the columns of the leading newspaper of an application by the Commercial Gas Company to be allowed the standard price for gas of "15s. 6d. per therm."

Of course, this is a printer's error. But I did not expect to have so quickly support for my contention that we should stick to farthings as our multiple of change. A very slight extension of ·16 of a penny upwards or ·1 of a penny downwards would have taken him safely over the obstacle which now I fear (and hope) invalidates his notice.

To his obvious reply that 15·6d. is the only correct figure and none other, I can only reiterate my belief that public understanding counts for something.

CHARLES CARPENTER.

709, *Old Kent Road, S.E.*,
Nov. 9, 1920.

[The price per therm appears correctly as 15·6d. in the Company's notice in the "London Gazette" dated Nov. 9.—ED. "G.J."]

Sulphur Removal by Oil.

SIR,—Your Editorial Note on "Sulphur Removal by Oil," in your issue of the 10th inst., states that "in this country we have not come to the stage when serious consideration has been given to the question of adopting oil-washing for the specific purpose of reducing the sulphur compounds in gas." In order to avoid any misapprehension in this matter, will you permit me to refer to a paper, on "A New Method of Extracting the Vaporous Constituents from Coal Gas," which I read before the London Section of the Society of Chemical Industry on Jan. 15, 1917, and which you reproduced in full on p. 347 of your issue of Feb. 20, 1917.

The method then described, which was subsequently worked successfully on a large scale under the ægis of the Department of Explosives Supply up to the time of the armistice, and which is still used by a number of coke-oven works for experimental and testing purposes, was originally conceived for the purpose of extracting not hydrocarbons, but organic sulphur compounds. The national emergency was responsible for diverting the process from its original purpose to that of the extraction of benzol and toluol. Although the Ministry of Munitions had only the supply of hydrocarbons in view when I was requested to make the method known by reading a paper, I deliberately chose the wider and more comprehensive title, in order to cover by it carbon bisulphide and other sulphur compounds.

My early experiments convinced me that the principle of abstracting sulphur compounds by substances for which they are good solvents could be elaborated on the large scale. I have experimental data showing that sulphur compounds can be reduced fairly easily to about 10 grains per 100 c.ft.—a result approaching those obtained by the application of catalysts at high temperature.

I feel inclined to agree with your view that an oil-washing process "for the purpose of sulphur removal only," could not be economically adopted in this country. But I have equally strong views on the question of a complete removal of all vaporous constituents from coal gas at some stage or other during the treatment at the gas-works.

By vaporous constituents, I mean all compounds in the gas which, if isolated, are either liquid or solid, chief among which would be carbon bisulphide, benzole, toluol, and naphthalene. The removal and isolation of these compounds would not preclude us from re-incorporating with the gas any or all of the hydrocarbons which may not impair the purity of the gas, or may be required for economic reasons. The cost of such complete removal of all, and possibly re-incorporation of some, of the vaporous constituents of coal gas should by no means be prohibitive, provided that plant and process are superior to those generally met with during the war.

Against the cost of running a suitable extraction process, the following items would appear on the credit side: Freedom from naphthalene troubles; value of naphthalene obtained directly in a fairly pure condition; value of other hydrocarbons, either in the liquid form for motor fuel and chemical purposes, or in vapour form for gas enriching; and last, but not least, recovered carbon bisulphide which can be obtained as such and is, in view of the great development of the viscose process for artificial silk-making, in great demand. Incidentally its extraction will remove at least one of the factors adversely affecting the life of gas-meters.

R. LESSING.

317, *High Holborn, W.C., Nov.* 15, 1920.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Power Alcohol.

Sir ROBERT HORNE, in the course of replies to questions in regard to the advisability of the Government taking steps to secure the production and distribution of power alcohol within the Empire, and to ensure that the coal consumed in this country should be so treated before use as to extract all possible available motor spirit, in view of the steadily rising price of motor fuel, said the Fuel Research Board had for a considerable time past been making investigations and experiments in the production of alternative supplies of motor fuel, including power alcohol. Their interim report, issued in July last [see "JOURNAL" for Sept. 29, p. 665], gave the results of these inquiries up to that time; and the research work was being continued. He was not aware that power alcohol was being produced in Africa below the price mentioned. The report showed the latest results of the investigations of the Committee. The Committee had taken into consideration that there were enormous supplies of material arising from sugar plantations for making power alcohol.

British Dyestuffs Industry.

Sir P. LLOYD-GREAME, replying to a question addressed to the President of the Board of Trade by Sir W. Barton, said the British Dyestuffs Corporation were not at present, and were not likely to be for some considerable time, in a position to produce the whole range of dyestuffs required by the textile industries of this country; but in view of all the obstacles which had to be overcome, he did not think there was ground for dissatisfaction with the progress that had been made. There had been some internal difficulties of a character not uncommon in the early stages of a large combination; but he was satisfied that every effort was being made by the Directors to remove the difficulties in question. The Government had two representatives on the Board of Directors, with special rights in order to secure the fulfilment of certain provisions of the Memorandum and Articles of Association; but the Government had no control beyond that of other shareholders over the internal management of the Company.

The PRIME MINISTER, replying to questions addressed to him by Mr. Grattan Doyle, said that the prospectus issued by the British Dyestuffs Corporation in July, 1919, quoted a statement made by the President of the Board of Trade on May 15, 1918, to the effect that the importation of foreign dyestuffs would be controlled by a system of licences for a period of not less than ten years after the war, and stated that effect had been given to this guarantee by a Proclamation dated Feb. 24, 1919, prohibiting the import of dyestuffs except under licence. This Proclamation, however, in common with others purporting to be made under section 43 of the Customs Consolidated Act, 1876, was rendered void by the decision of Mr. Justice Sankey in December, 1919, in the case of *Attorney-General v. Brown*. There was therefore at present no restriction on the import of dyestuffs; and the importation has increased in the course of the present year. The Government, however, fully recognized their obligations in the matter; and it was intended to introduce legislation dealing with the subject at the earliest possible moment. In regard to his previous decision against the introduction of a non-contentious measure, if Mr. Doyle could give a guarantee that such a measure would be non-contentious, it might alter the view of the Government.

Mr. DOYLE subsequently asked the Prime Minister whether the consumers and manufacturers of the British dyestuffs industry were substantially agreed as to the lines upon which a Bill to safeguard its interests should be framed; and, if so, would the Government introduce a Bill without any unnecessary delay.

The PRIME MINISTER said he was sorry to say that, after inquiry, there was no substantial agreement as suggested in the first part of the question. If there had been agreement, there would have been a fair prospect of putting a Bill through this session. In regard to the second part of the question, the Government were prepared to give an undertaking that the matter would be dealt with, and legislation would include the Government's proposals, carrying out the pledges in this matter and the obligations contained in the prospectus of the British Dyestuffs Corporation.

Mr. DOYLE asked whether, if satisfactory assurance was received that there was substantial agreement, he would introduce legislation.

The PRIME MINISTER replied that Mr. Doyle was more sanguine than was the President of the Board of Trade. If there was an agreement that a Bill would go through the House easily, that was a matter the Government were prepared to consider.

German Dyestuffs.

Mr. A. SHAW asked the President of the Board of Trade whether he was aware that French textile manufacturers were, and had for long been, receiving large quantities of German dyes which enabled them to compete with our textile manufacturers on favourable terms in foreign markets; and whether, in view of the importance to this country of its export trade in textiles, we were receiving, by way of reparation or otherwise, an adequate proportion of the German dyestuffs.

Sir R. HORNE said he had no reason to suppose that the French consumers of dyestuffs had been placed in an unduly favourable position, as compared with British consumers, in respect of supplies from Germany, or to doubt the adequacy of the supplies being received from that country by way of reparation and otherwise.

Mr. GRATTAN DOYLE asked whether German dyestuffs were imported into the United Kingdom, not only on direct registration, but also through those countries whose frontiers were contiguous with those of Germany.

Sir R. HORNE said that a certain proportion of the exports of German dyestuffs was through Belgium and Holland, and it might be assumed that the whole of the exports consigned to the United Kingdom from these two countries was of German origin. The total quantity of synthetic dyestuffs and intermediate products imported from Holland, Belgium, and Germany in the first nine months of the year was 2986 tons. A small proportion of the dyestuffs consigned from Switzerland to this country was also probably of German origin; but it was not possible to form any reliable estimate of the amount. Of the quantity referred to, 877 tons was in respect of reparation supplies from Germany.

Public Utility Companies (Capital Issues) Act.

Copies were presented of reports on applications to the Board of Trade under the Public Utility Companies (Capital Issues) Act, by the Wolverhampton Gas Company and the Fleetwood Gas Company.

Reading Gas Company Savings Association.—The report of the Committee for the year ended Sept. 30 of the Reading Gas Company's (Works) Savings Association, of which Mr. D. H. Helps is President, states that the total subscriptions since the commencement of the Association amount to £2035, *plus* a bonus of £21 granted by the Directors; and 2558 certificates have been issued. Subscriptions for the period from Oct. 1, 1919, to Sept. 30, 1920, totalled £524.

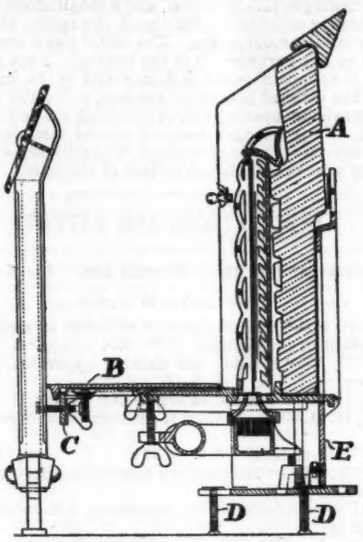
REGISTER OF PATENTS.

Inset Gas-Fires.—No. 152,191.

AIRD, K., and WEBSTER, S. A. D., of Falkirk.

No. 23,436; Sept. 24, 1919.

This invention relates to a gas-fire adapted to be insetted in a domestic fire-place. It comprises a metal frame including a fuel plate which serves to sustain a fire-brick back and form a base for the radiants.



Aird and Webster's Inset Gas-Fire.

The gas-fire shown includes (as heretofore) a back brick A of channel section, in front of which are fitted columnar radiants held in place by a cross rod, the back brick and radiants resting on the fuel plate. B is a trivet having pin-and-slot connections with the fuel plate, so as to permit horizontal adjustment of the trivet towards or away from the back brick and thus accommodate the fire to the fire-place. The trivet is connected to a crossbar C connected to fire dogs, feet, or supports, one on each side of the fire, the attachment being such as to permit of vertical adjustment of the crossbar C and therewith of the trivet. The fuel plate is vertically adjustable by manipulation of screws D, the heads of which abut on the hearth, and engage a plate sustaining the structure E that carries the fuel plate.

Extraction of Naphthalene from Coal Gas.

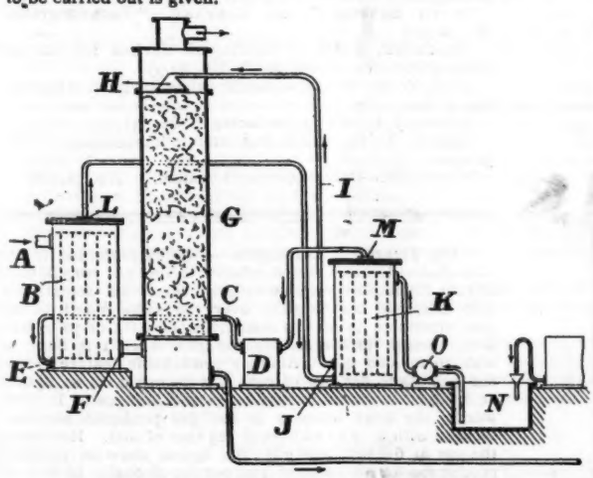
No. 151,463.

MARBAIS, D., of Paris, and DEGUIDE, C., of Montmorency, France.

No. 22,544; Sept. 13, 1919.

This invention relates to a continuous process for the extraction of naphthalene, as described in patent No. 118,730. It is characterized by maintaining the coal gas and the anthracene oil constantly at well-defined temperatures, most favourable for effecting the absorption of naphthalene—viz., at about 22° C. for the oil and about 18° C. for the gas to be scrubbed.

A diagrammatic illustration of apparatus which enables the process to be carried out is given.



Marbais and Deguide's Naphthalene Extractor.

The gas obtained by the distillation of coal and charged with naphthalene enters at A into a refrigerator B, maintained at a suitable temperature by the circulation of cooling water delivered at C by a refrigerating machine D, and passing at E into the refrigerator. The coal gas, leaving the refrigerator by the outlet F at a constant temperature of 18° C., enters at the bottom of a scrubbing tower G, containing a filling of separating material having a large contact surface—for example, wood shavings, iron scrap, iron or steel turnings, or the like. The gas, in passing through this filling, is brought into intimate contact with the anthracene oil, which enters the top of the scrubber at H, and trickles down through the filling. The oil is delivered at a temperature of about 22° C. by the pipe I from the outlet J of a refrigerator K. The latter is traversed by a circulation of cooling water, which maintains it at the desired constant temperature. For this purpose, there is preferably utilized, as shown, the water leaving the cooler at L, and entering the bottom of the refrigerator; leaving the latter at M and being returned to the refrigerating machine D.

The hot anthracene oil entering the refrigerator is free from naphthalene. It is saturated with benzole by the addition of about 4 p.ct. of the latter, so as to prevent the oil from absorbing benzole from the coal gas while absorbing naphthalene in the scrubbing tower G.

By this procedure, there is obtained at the exit from the scrubber coal gas which is practically completely freed from naphthalene. The anthracene oil leaving the bottom of the scrubber removes, in fact, about 95 p.ct. of the total naphthalene contained in the gas.

The oil, thus charged with naphthalene, passes to suitable distilling apparatus [not shown] similar to that described in patent No. 118,730, for separating by fractional distillation by steam anthracene oil from hydrocarbons (benzole, toluol, solvent naphtha, and naphthalene) contained in the oil. There is thus obtained anthracene oil, completely freed from naphthalene, which, after being restored to a temperature of about 22° C. by its passage through the refrigerator, can be utilized again for absorbing a fresh quantity of naphthalene by being brought into intimate contact in the scrubbing tower G with a fresh charge of coal gas at about 18° C.

Since this distillation has also the result of separating the benzole contained in the anthracene oil, it is desirable to add an equivalent proportion of 4 p.ct. of benzole to the oil before using it again for treating the coal gas. This addition takes place in a collector vessel N, into which the oil, freed from naphthalene by the distilling apparatus, is sucked-up by the pump O, and delivered to the refrigerator.

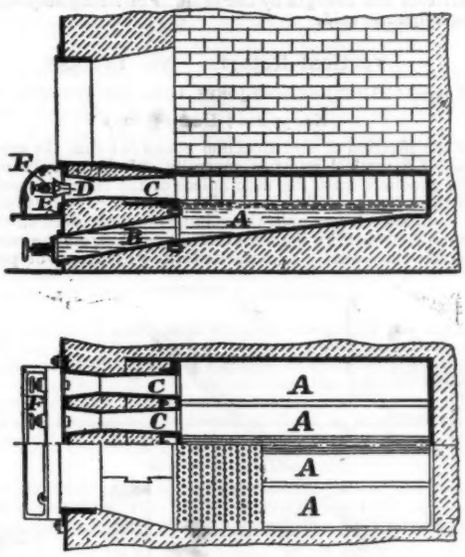
Furnaces for Heating Gas-Retorts.—No. 152,369.

LITWIN, P., of Berlin.

No. 1166; Jan. 21, 1918.

The object of this invention is to enable the coke as it comes from the retort to be used as "the bottom fuel in the gas generator, or the mixture of coarse coke and coke ash to be burned up as such."

The inventor proposes to construct a coke furnace of a combustion chamber having stationary grates or fire-bars having small openings through which the ash cannot pass excepting in negligible quantities, in combination with a series of separate water chambers under each section of grates, and steam and air injectors for causing a blast of steam and air to pass in under each section of grates.



Litwin's Gas-Retort Furnaces.

A longitudinal section and a plan (partly in section) of the arrangement are given.

The furnace consists of a combustion chamber having a grate frame the lower part of which is constructed as a water tank A, the different chambers of which (four chambers separate from one another are provided) can be emptied by a pipe B closed by a door. In each of the chambers is a suction pipe C and an injector nozzle or blower D through which a mixture of steam and air is blown under the grate, and escapes through nozzle-like openings in the stationary fire-bars—the openings being small so that only a very small quantity of ash can fall through.

The air is drawn in through a casing E, the inlet opening of which can be adjusted by a slide. Each of the nozzles has a regulating needle adjustable in a screw socket employed for tightening-up the nozzle casing in the steam supply pipe F. By means of the needle the nozzle opening can be adjusted for the passage of any quantity as desired. In order that the force of the stream may be utilized to the

best advantage, a hollow body is arranged around the nozzle, into which body air is drawn with great velocity and, in consequence, in turn draws air through the suction pipe C.

As in every chamber there is a separately controlled steam jet blower, the pressure in the different chambers can be regulated as required; and as the fine-grain fuel lies in a heap in the middle, it is necessary especially at the outset, in order to ensure uniform combustion, that a more powerful mixture of steam and air should be supplied to it than to the material in large pieces lying loosely against the sides. This can be effected by adjusting the nozzles; and "in this way it is possible to ensure uniform combustion of the fuel over the whole surface of the grate and to prevent the formation of slag on the sides."

Purification of Benzole.—No. 152,470.

SOUTH METROPOLITAN GAS COMPANY, EVANS, E. V., and HOLLINGS, H., Old Kent Road, S.E.

No. 20,217; Aug. 16, 1919.

It is customary, the patentee remarks, to remove thiophens from benzole, or other light oils containing them, by converting them into sulphonic acids. For this purpose, the benzole or the like is agitated with a small proportion of its weight of concentrated sulphuric acid. The operation is accompanied by loss of benzene or its homologues, because under the conditions used the sulphuric acid converts some of these hydrocarbons also into sulphonic acids.

The present invention minimizes this loss, and is based on the observation that, by using a comparatively dilute sulphuric acid at a raised temperature, the thiophens can be sulphonated without appreciable sulphonation of benzene or the like.

The invention consists in removing thiophens from benzole by heating the benzole at a temperature between 30° and 90° C. with sulphuric acid of 60 to 85 p.ct. strength.

The strength of the sulphuric acid used depends on the temperature—the higher the latter, the more dilute may be the acid. The time required for the sulphonation of the thiophens depends upon the design of the sulphonator, and the strength and temperature of the acid. In any sulphonator the time is greater the lower the strength and temperature of the acid. It is convenient to boil the benzene with the acid; and at this temperature an acid containing 73 to 82 p.ct. of H_2SO_4 has been found satisfactory. Another method is to pass the vapour of the benzene to be purified through the sulphuric acid of suitable strength and temperature—say, through acid of 70 p.ct. strength at 84° C.

The following example illustrates the invention: 500 gallons of motor benzole to be purified and 50 gallons of sulphuric acid of 82 p.ct. strength are run into a sulphonator fitted with the usual devices for heating and stirring, and with a reflux condenser. The mixture is heated to (say) 83° C. for about two hours—the exact time depending on the degree of agitation. The benzole is then separated by gravity or by distillation, and is substantially free from thiophens. The acid, which is diluted by the action, may be concentrated for re-use unless an undue proportion has been destroyed by impurities in the benzole; or, preferably, a part of it is discarded and the rest made-up to the original bulk and strength by the addition of strong sulphuric acid or fuming sulphuric acid.

Vertical Retorts.—No. 152,548.

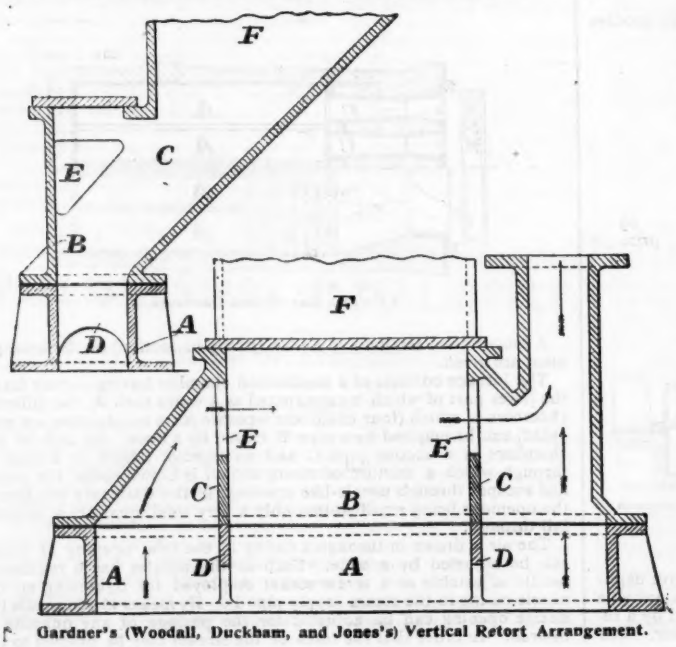
WOODALL, DUCKHAM, AND JONES, LTD., and GARDNER, W. T.

No. 32,220; Dec. 23, 1919.

The specification of this invention points out that the cross section in plan of a vertical retort is generally oblong, and the off-take of volatile products from the mouthpiece of the retort is usually at one end of this oblong. When the major axis of the retort is increased in order to obtain a larger unit, the volatile products given off on the side of the retort away from the outlet have to pass across the retort before they reach the outlet. A more uniform withdrawal of products is secured by this invention—consisting in a construction which allows of the escape from over the whole surface of the top of the retort. Heretofore the mouthpiece has been practically a continuation of the charging hopper, and has become filled with coal; so that there has been no passage for gas except at the end of the mouthpiece at which the off-take is situated. By this invention the chamber within the mouth piece is subdivided by partitions which confine the coal as it leaves the hopper, and until it has descended through the mouthpiece, so that there is a free space at each end of the mouthpiece. Each partition has an opening at its upper part permitting a passage of gas across the coal in the mouthpiece.

The illustration shows a cross section through a mouthpiece constructed according to this invention, and a longitudinal vertical section.

A is the casting constituting the top of the retort, and B is the casting constituting the mouthpiece. The latter has transverse partitions C extended by like partitions D in the casting. Each partition has an opening E, the shape of which is determined by the angle of repose of the coal on the inclined bottom of the hopper F; the object being to permit the maximum opening while preventing the flow of coal through the opening. Thus the coal does not spread laterally into the retort until it has arrived at the lower edge of the partitions, and the products can travel-up over the whole top surface of the retort.



Gardner's (Woodall, Duckham, and Jones's) Vertical Retort Arrangement.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Nov. 10.]

Nos. 30,757 to 31,463.

BRINGHENTI, P.—"Utilizing heat in mixtures of steam and gas for producing power or for heating, &c." No. 31,099.

COLEMAN, C. J.—"Heating and cooking apparatus." Nos. 31,161, 31,162, 31,304.

COLEMAN, C. J.—"Water-heaters."—No. 31,305.

DUDGEON, H. M.—"Incandescent gas mantles and mantle carriers." No. 31,170.

FOX, T.—"Gas-meters." No. 31,283.

FREEMAN, N. H.—"Temperature controlling devices for furnace chambers." No. 31,201.

GRANT, A. J.—"Apparatus for separating substances from gases, &c." No. 30,954.

HARKER, W. E.—"Needles for cleaning burners of atmospheric burners." No. 30,831.

HEARSON, J. W.—"Apparatus for gasification of solid fuel, tar, and oils." No. 31,174.

JONES, D. G.—See Grant. No. 30,954.

KUNHEIM & CO.—"Pyrophoric igniter of cerium metal alloys." No. 30,853.

KURTH, H.—"Heating device or plant for solid, liquid, gaseous, or steam-like combustibles." No. 31,459.

LAMPLOUGH, F.—"Retorts for low-temperature distillation." No. 31,200.

LEECH, E. B.—"Protector for incandescent gas mantles." No. 30,758.

LEVI, H.—"Gas-mantles, &c." No. 31,289.

MOGEL, P.—See Kurth. No. 31,459.

NORTON, J. W.—"Fitting for gas-stoves, fire-places, &c., for airing clothes." No. 31,210.

OIL EXTRACTORS, LTD.—See Lamplough. No. 31,200.

PEARCE, J. H.—See Dudgeon. No. 31,170.

POWELL, J. R.—See Norton. No. 31,210.

ROBIN, J. T.—"Testing gas-mantles, &c." No. 31,272.

ROBINSON, S.—See Fox. No. 31,283.

ROSSI, P.—"Device for automatically controlling gas-burners." No. 31,067.

SHAKESPEARE, J. T.—"Heat radiator and food-warmer for use on gas-brackets." No. 31,387.

SHEWRING, F.—See Hearson. No. 31,174.

SLACK, J. E.—"Pipe-joints." No. 30,958.

SOCD. EXPLOITATION DES BREVETS C. ARNOULD.—"Obtaining pitch from tar, &c., oils." No. 31,265.

SOUTH SUBURBAN GAS COMPANY.—"Furnace-grates." No. 30,928.

SUNDBERG, E. L.—"Shutting-off devices for conduits leading to cocks, valves, &c." No. 30,970.

TATE, W. R.—"Appliances for delivering gaseous liquids." No. 30,860.

WELLS, J. F.—"Gas-producers." No. 31,082.

WHITE, A. R.—"Gas and mantle economizer." No. 31,030.

WHITE, W.—"Gas stoves and heaters." No. 31,266.

Big Figures at Llandudno.—Figures presented to the Llandudno Urban Council relative to the gas consumption during September were considered somewhat remarkable. The increased consumption over the same month of last year amounted to no less than 5,762,000 c.ft., or 70·56 p.ct. The increase for the six months from April 1 to Sept. 30 was 16,107,000 c.ft. Another remarkable feature is that the gas made per ton of coal was 17,799 c.ft., as against 10,888 c.ft. in the corresponding period last year. In other words, the large increase in the gas produced has been secured with only an additional 32½ tons of coal. Reckoning the gas at 6s. per 1000 c.ft., the figures show an increased production to the value of 42s. per ton of coal. In view of this increased output, it is reasonable to assume that a surplus may be anticipated from the gas undertaking at the end of the financial year. Mr. Thomas (Chairman of the Gas Committee), when calling attention to the increased make, was told that "figures could be cooked, but they could not cook with the gas."

MISCELLANEOUS NEWS.

LONDON GAS EXAMINERS' PAY.

Under the Heat-Unit Basis.

Referring to the supply of gas on the calorific basis in the South Metropolitan Gas Company's area, the Public Control Committee of the London County Council in a report remark that the Metropolitan Gas Referees, upon whom rests the onus of prescribing the type of recording calorimeter to be used, are not yet in a position to do so; but they have issued a notification prescribing the necessary tests [see *ante*, p. 138]. These are so arranged that, whereas formerly a gas examiner could accomplish his work in about two-and-a-half hours, it now takes nearly double that time, with the added disadvantage that the work is spread over a period of seven hours. The Committee have accordingly reviewed the rate of remuneration for gas examiners generally with special reference to those who test in the area supplied by the South Metropolitan Company. Previous to the last revision in April, 1919, the rates were 10s. and 10s. 6d. a testing, according to the district in which a gas examiner was employed. To meet the increased cost of living, this was raised on the date named to a flat-rate of 13s. a testing. Since that time the Council's staff generally has been granted certain percentage additions; and, on this basis, it appears to the Committee, that an equitable rate of pay for gas examiners in the districts of the Commercial Gas Company and the Gas Light and Coke Company, who are practically "one-third time" officers, would be 16s. a testing. The gas examiners in the area of the South Metropolitan Gas Company are now somewhat more than "half-time" officers, and must be remunerated on this basis. After full consideration, the Committee are satisfied that, having regard to the great increase in the amount of work now devolving upon the examiners, a suitable payment, during the continuance of the present notification, would be 25s. a testing. Sunday work in the Company's area will also, under the new arrangements, be a much greater strain on a gas examiner than formerly; and the Committee propose that the payment for what is practically a whole Sunday's work shall be 30s. When the Gas Referees shall be in a position to prescribe a recording calorimeter, a fresh notification will be issued; and it is probable that considerable alterations in testing arrangements will follow. The additional cost of giving effect to the new arrangements as from Oct. 18, 1920 (the date of the new notification), up to the end of the current financial year, will be £900 15s. As there is no provision for this expenditure in the current maintenance votes, the Committee have forwarded to the Finance Committee the necessary supplemental maintenance estimate. Recommendations to give effect to these proposals follow.

METER EXAMINING AND TESTING FEES.

Order of the Board of Trade.

The Board of Trade, under the powers conferred by section 11 of the Gas Regulation Act, 1920, have determined that the fees for the examination, comparison, and testing, with or without stamping, of meters shall be as stated in the schedule annexed, in lieu of the fees fixed by section 19 of the Sale of Gas Act, 1859. This Order will come into operation on Jan. 1, 1921.

SCHEDULE.

For all meters with a measuring capacity up to 50 c.ft. per hour (as indicated on the meter by the maker)	1s. 0d.
For each additional 100 c.ft. or part thereof in the case of a dry meter	0 6
Or in the case of a wet meter	0 9

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" notices of further applications by gas undertakings to the Board of Trade under section 1 of the Gas Regulation Act for Orders providing for—(*a*) The repeal of any enactments or other provisions requiring the undertakers to supply gas of any particular illuminating [or calorific] value, and the substitution therefor of power to charge for thermal units supplied in the form of gas; and (*b*) the modification of the statutory or other provisions affecting the charges which may be made by the undertakers by substituting for the maximum [or standard] price per 1000 c.ft. now authorized, with an addition to meet increases in the costs and charges of, and incidental to, the production and supply of gas by the undertakers since June 30, 1914, a maximum [or standard] price per therm (100,000 B.Th.U.).

A copy of the applications made to the Board of Trade, and of all the documents submitted therewith, may be inspected, free of charge, at the gas offices concerned.

Any local authority or person desiring to make representations with regard to the application may do so by letter addressed to the Assistant Secretary, Power, Transport, and Economic Department, Board of Trade, Great George Street, S.W., and posted not later than the date specified in the notice.

Ashton Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 8d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute is 1s. 7d. per therm.

City of Chichester Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers within the limits of supply of the Company as defined by the Chichester Gas Act, 1868, is 4s. 6d. per 1000 c.ft., and within the additional area added by the Chichester Gas Act, 1911, 5s. per 1000 c.ft. The prices which the undertakers have asked the Board of Trade to substitute for these are 1s. 11d. per therm and 2s. 2d. per therm respectively.

Commercial Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 3d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 15·6d. per therm.

Eastbourne Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 4d. per 1000 c.ft. within the town and parish of Eastbourne and the parishes of Willingdon, Westham, and Pevensey, all in the county of Sussex, with an addition to such standard price of 5d. per 1000 c.ft. within the parishes of Arlington, Hailsham, Hellingly, and so much of the parish of Hurstmonceux as is not included within the limits of supply of the Bexhill Water and Gas Company, as defined by the Bexhill Water and Gas Act, 1904; and the price which the undertakers have asked the Board of Trade to substitute for this is 20·6d. per therm within the town and parish of Eastbourne, and the parishes of Willingdon, Westham, and Pevensey, with an addition of 1d. per therm within the parishes of Arlington, Hailsham, Hellingly, and so much of the parish of Hurstmonceux as aforesaid.

Falmouth Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute is 1s. 9d. per therm.

Frodsham Gas and Water Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 7d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Gas Light and Coke Company.

The notice states that the Company have applied for an Order providing, in addition to (*a*) and (*b*) as above, for—

(*c*) such modification of any provisions whereby the rate of dividend payable by the undertakers or any other payment is dependent on the price of gas supplied as may appear to the Board of Trade to be necessary.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 2d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute is 1s. 3·6d. per therm.

Grantham Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 2s. per therm.

Great Yarmouth Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 9d. per therm.

Kidderminster Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 3s. 9d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6d. per therm.

Newport (Mon.) Gas Company (Amended Notice).

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 8d. per therm.

Preston Gas Company (Second Notice).

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 4d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 5·6d. per therm.

The undertakers are authorized to charge for the supply of gas within any part of their limits of supply which is outside the county borough of Preston and the township of Fulwood a differential price of not more than 2½d. per 1000 c.ft. over the price for the time being charged in the said borough and township; and the amount per therm which they have asked the Board of Trade to substitute for such differential price of 2½d. per 1000 c.ft. is ½d. per therm.

Runcorn Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 6d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 4½d. per therm.

St. Albans Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 4d. per 1000 c.ft. within the city of St. Albans or within one mile from the town hall of the city, and 3s. 10d. elsewhere within the Company's limits. The price which the undertakers have asked the Board of Trade to substitute for this is 1s. 5½d. per therm within the city of St. Albans or within one mile from the town hall of the city, with an additional 1½d. per therm for elsewhere within the Company's limits.

Sheringham Gas and Water Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. 6d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 20·8d. per therm.

Southampton Gas Light and Coke Company. (Amended Notice.)

The maximum prices now authorized in respect of the supply of gas by the undertakers are 3s. 6d. per 1000 c.ft. within the county borough

of Southampton and the urban district of Eastleigh, and 4s. 6d. per 1000 c.ft. within the remainder of the Company's area of supply; and the prices which they have asked the Board of Trade to substitute for these are 1s. 6d. per therm within the county borough of Southampton and the urban district of Eastleigh, and 2s. per therm within the remainder of the Company's area of supply.

Torquay Gas Company.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 3d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 7d. per therm.

Tottenham District Light, Heat, and Power Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 8d. per 1000 c.ft.; and the price which they have asked the Board of Trade to substitute for this is 1s. 7d. per therm.

Willenhall Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 3s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 1½d. per therm.

Wrexham Gas Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 4s. per 1000 c.ft. within the radius of one mile from the centre of the doorstep of the north porch of the church of St. Giles or parish church of Wrexham, 4s. 6d. per 1000 c.ft. within a radius of two miles from the same point, and 5s. per 1000 c.ft. beyond the said radius of two miles; and the prices which they have asked the Board of Trade to substitute for these prices are 1s. 7d. per therm within a radius of one mile from the centre of the doorstep of the north porch of the church of St. Giles or parish church of Wrexham, 1s. 8·2d. per therm within a radius of two miles from the same point, and 1s. 9·4d. per therm beyond the said radius of two miles.

Loughborough's Gas Undertaking.—To the great gratification of the Loughborough Corporation, Mr. W. F. Charles (Chairman of the Gas Committee) has undertaken to fill, for a second year, the office of Mayor of the borough, to which he was re-elected at the customary meeting on the 9th inst., when, in returning thanks, he alluded to the circumstance that, at the period when he first became Chairman of the Committee, the gas undertaking was really only in the condition of a large village works. Necessary stoking plant and other appliances had since been added, to enable gas to be produced at a more economical rate. At present they were producing some 150 million c.ft. per annum with practically the same plant; and, in anticipation of inevitable expenditure, he emphasized the consideration that it would be obviously impossible to continue to increase the production without some very material reconstruction of the works.

LEVEN AND METHIL GAS ARBITRATION.

Purchase by the Burgh of Buckhaven.

Immediately following the proceedings recorded in the last issues of the "JOURNAL" in the inquiry to determine the price to be paid for the undertaking of the East Wemyss Gas Company, an arbitration was held to fix the terms on which the Leven and Methil Gas Company, Ltd., were to be taken over by the same authority—that is, the Burgh of Buckhaven, Methil, and Innerleven. The Leven Company were offered £37,967, but stood out for £72,200, together with £2398 for loose assets. The subsequent award put the price to be paid at £41,641 inclusive.

The arbitration took place in the North British Station Hotel, Edinburgh, with Lord ASHMORE as Oversman. Mr. HENRY WOODALL acted as Arbitrator for the Town Council; and Mr. ALEXANDER YUILL for the Gas Company.

Counsel appearing were: Mr. ALEXANDER MONCRIEFF, K.C., and Mr. J. B. PATON (instructed by Messrs. Smith and Grant), for the Company; Mr. A. H. B. CONSTABLE, K.C., and Mr. W. T. WATSON (instructed by Mr. Robert Leslie and Messrs. Pearson, Robertson, and Maconochie), for the Town Council. Mr. J. A. STUART was Clerk and Legal Assessor.

EVIDENCE ON BEHALF OF THE GAS COMPANY.

Mr. *John S. Gowans*, chartered accountant, of the firm of Messrs. A. & J. Robertson, examined by Mr. MONCRIEFF, said he had collaborated with Mr. J. W. Napier, of Alloa, in an investigation of the Company's accounts. In the course of his inquiry, he ascertained that the Company had had its origin following a meeting of the inhabitants of Leven in January, 1837. A Company was formed, the object being to issue 700 shares of £1 each. The Company took power to increase the number of shares or to pay additional instalments on the shares if more capital was required. They continued in business as an unincorporated Company until 1908, when resolutions were passed which resulted in the business being transferred to a new Company, which was incorporated with limited liability. The practice of the Directors of the old Company had been to submit printed accounts to the shareholders year by year; and this practice was continued by the limited Company, though the accounts were not kept in statutory form. Among the papers of the Company, he found a structural valuation of the works made by Mr. Charles Fairweather, of Kilmarnock, in 1907. This brought out a figure of £15,916, which amount was entered in the balance-sheet of the Company issued on April 30, 1908. He did not find any earlier valuation; but the books of the Company showed in detail the sums spent from time to time upon the works.

As to the share issues, the first, in 1837, amounted to 511 shares of £1 each. During the next nine years a further number of shares were

A REMINDER.

The following radical improvements were introduced and popularized by "WILSONS"—the Pioneers in Gas Fire Construction:—

A separate radiant surrounding each flame.
The Duplex Burner and Tap.
The use of Gas and Air Adjusters.
Silent, well-aërated flames.
Continuous pattern of Fire Front.
The popular inset Grate, "The Sunbeam."

WILSONS & MATHIESONS, Ltd.,

Carlton Works, Armley, LEEDS.

London Office: 76, QUEEN STREET, CHEAPSIDE, E.C.

issued to the amount of £395, bringing the capital of the Company as at 1846 up to 906 shares. In the same year there was another issue which made the capital 1500 shares. Then there was a gradual increase in the number, until at June, 1897, prior to the incorporation of the limited Company, there were 1800 shares, to which bonus shares were added, making the total 3600. After the incorporation of the limited Company, the capital was further increased; shares to the number of 5400 being issued for cash, at a premium of 2s. 6d. per share, on Jan. 15, 1901. The premium amounted in all to £675, and was not treated as capital of the Company. By the issue of these shares in 1901, the capital of the new Company was brought up to 9000 shares. This was doubled in December, 1908, by the issue of an additional 9000 shares—one half for cash, and the other half as bonus shares. Thus the capital stood at 18,000 shares, of which 11,700 were issued for cash, and 6300 by way of bonus. At this figure the capital had since remained. Though not kept in statutory manner, the accounts were in the form usually followed by an ordinary trading company.

Witness put in a statement which showed the sums expended on the works and those written-off subsequent to the date of Mr. Fairweather's valuation in 1907. The total expenditure he found to be £31,570—that was, up to 1919, *plus* the valuation in 1907. The deductions were: Surplus assets transferred, £552; depreciation written-off over the whole period, £7992; and old material sold, £317. This, deducted from the expenditure, left a balance of £22,709, as the value of the works at April, 1919. In the years between 1907 and 1914, the sums expended upon additional works exceeded in most, if not in all, cases the sums written-off for depreciation, so that the capital figure which started at £15,916 in Mr. Fairweather's valuation was in 1914 raised to a figure of £24,787. On the other hand, his (witness's) statement showed that in the subsequent years the amount of additions to the works was in each case less than the amount written-off for depreciation, so that the final figure of valuation was £22,709, as already stated.

Another paper showed the dividends paid by the Company in each of the years between 1890 and 1919. The face value of the dividends was greater in the earlier than in the later years. It began with 10 p.ct., fell to 7½ p.ct., and then to 5 p.ct., after which it rose again. Of course, the dividend in the earlier years was paid upon only 1800 shares; but with the increase of capital, it came eventually to be paid upon 18,000 shares. The smaller rate of dividend in later years accordingly coincided with a progressive state of the Company's business rather than a diminishing state. In spite of war conditions, the dividends had not very seriously diminished from the standard reached in 1914. Transfers of shares between 1908 and 1919 had been set out, and showed that in the first-named year shares were in all cases transferred at par. In 1914, however, the price of the shares had risen, before the notice to treat was served, to 37s. 6d.; and at a later period of the same year they had reached 43s. 6d. The highest price at which shares were transferred was reached in 1915, and again in 1919, when the figure of 45s. was recorded in the case of two transactions. The price of the shares in the post-war years kept uniformly above, or nearly at the level of, the highest price obtained prior to the service of the notice to treat.

The next matter dealt with by him was the profits made by the Company as shown in their accounts, and the profits made by them upon his reconstruction of the accounts. In each year the profits on the accounts as reconstructed exceeded those actually shown in the accounts. This excess was arrived at by transferring against capital certain payments which the Company had placed against revenue. As regarded the progress of the Company (taking their own accounts) the profit of £1646 shown in 1909 rose to a profit of £3543 in 1914. This profit had been arrived at by an increase from year to year, though subject to fluctuations in individual years; and it had, in point of fact, been exceeded in the previous years. In the post-war years, the profit, again subject to fluctuations, tended to diminish slightly.

In 1909 the production of gas was 38 million c.ft., with a loss by leakage of some 4 millions, or 34 million c.ft. of gas used. The figures in 1914 showed a production of 61 million c.ft., less 5½ millions for leakage, or a consumption of 55½ millions. Coming to 1919, the total production was 62½ million c.ft., the loss by leakage about 8½ millions, and the consumption 54 millions. The coal carbonized in 1909 was 3894 tons, at an average cost of 13s. 1¾d. per ton for coal and cartage; in 1914, 6481 tons, at an average price of 15s.; and in 1919, 6748 tons, at an average price of 25s. 7½d. per ton. Whereas in 1908 the price of gas for ordinary consumers in Leven was 3s. 6½d. per 1000 c.ft., it fell in the next seven pre-war years to a uniform rate of 3s. 4d. It was the practice of the Company to charge prepayment consumers in Leven an additional price of 5d. per 1000 c.ft.; and in the earlier years an extra price was charged against the ordinary consumers in Methil, who, however, from 1911 were treated on an equal footing with the Leven consumers. The prepayment consumers in Methil were also subject to an additional charge of 5d. above the price charged the ordinary consumers. For power purposes gas was supplied from 1908 until after the outbreak of war in all districts at the uniform rate of 2s. 11d. per 1000 c.ft. The price of gas to ordinary consumers was raised in 1916 from 3s. 4d. to 4s. 2d. per 1000 c.ft., in 1918 to 4s. 7d., and in 1919 to 5s.; the prepayment rates being somewhat in excess of these figures, though not to the full amount of 5d. per 1000 c.ft., and the treatment of Methil and Leven remaining uniform as before. In analyzing the Company's accounts with the view of ascertaining the maintainable profit, he had followed the same course of reconstruction as in the East Wemyss case. According to this, the profits increased from £1859 in 1909 to £3779 in 1914. Except in 1916, the profits had been very little affected by post-war conditions. The profits which were "stored" by the Company amounted in 1909 to £1692, had more than doubled in 1913, and in 1914 totalled £3600. The business was a prosperous one; and the books were very satisfactorily kept.

Mr. CONSTABLE (in cross-examination): With regard to the capital expenditure out of profits, are we agreed that prior to 1908 there must have been expenditure upon the undertaking out of revenue to the

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amount of at least £6000, if Mr. Fairweather's valuation is reliable? Should I be right in saying that, according to the accounts of the Company, there was capital expenditure on structural improvements between 1908 and 1914 amounting again to rather over £6000?

Witness: I think that is so. Of course, that is the old question of depreciation. They were probably writing-off depreciation while it was not depreciation.

In the published accounts of the Company (apparently differing from those of the East Wemyss Company) there is no express reference made to depreciation. I am told the difference is that it is not shown in the trading account. It is shown in the profit and loss account?—Yes, quite plainly. It is shown every year. There is also a reserve fund which in 1914 stood at £1500. If you add together the amounts noted to depreciation and reserve for the period from 1908 to 1914, they come to £5600. They are excellent works from my point of view, and deserve a large price.

Fixed upon the maintainable profit, which you agree with me in this case represents a somewhat difficult problem to solve?—I have had no d ifficulty in solving it, and have brought out £3999.

Mr. MONCRIEFF: We repeat our arguments in the East Wemyss case as to multiplier, without re-uttering them. The arguments are practically the same in principle.

Mr. *A. W. Robertson Durham*, a partner with Mr. Gowans, concurred with the evidence that witness had given.

Mr. *J. W. Napier*, Gas Engineer to the Corporation of Alloa, replying to Mr. MONCRIEFF, said the site of the works was a fortunate one from the point of view of extensions. He found the plant and buildings to be in an excellent state of repair. The management had been up-to-date; and the latest types of plant had been introduced, particularly for dealing with the residuals. The coal storage capacity, equivalent to about four weeks' consumption, was ample, considering the nearness of the works to the coalfields. There was a margin in carbonizing capacity, and in other portions of the plant. The dimensions of the mains set out in a statement showed that they were quite ample for the requirements. There were considerable lengths of 2-in. and 1½-in. main-pipes; but these were in short streets, where the supply was for a limited number of consumers. It had been found in practice that the pressure available was ample; so that the distributing system must be in good average condition. As regards unaccounted-for gas, he found the percentage for Leven in 1914 was 9·1; and for the six years 1909 to 1914, it was 11·11. Looking at other mining districts, the figure in 1919 for Motherwell was 9·63 p.ct; for Hamilton, the 1914 figure was no more than 10·99 p.ct.; while for Larkhall, it was 15 p.ct. In the account year the sum spent on repairs worked-out at only 4·42d. per 1000 c.ft. of gas. To meet the suggestion that there should be additional expenditure allowed, he added £365 for repairs, and brought out a maintainable profit of £3399, which multiplied by twenty years' purchase would result in a valuation of the works of £67,980. For heritable property not part of the gas undertaking, he added £2430, and also a sum of £63 being five years' purchase of the show-room profits. With a half-year's purchase added for disturbance, his total valuation was £72,182.

The OVERSMAN: Are you willing to concede that the undertaking should be regarded as including outstanding debts and stocks of coal, gas, purifying materials, and residual products?

Mr. MONCRIEFF: All except the heritable property, which is the subject of valuation, *plus* a certain claim in respect of surplus plant.

Witness, further examined, showed how he worked-out a total claim in respect of surplus plant of £5518, in addition to any figure reached as the valuation of the general undertaking. In inviting the Tribunal to entertain this question of a separate value to be attached to surplus plant, he referred to three cases—Chard, Nantwich, Colwyn Bay.

Mr. CONSTABLE (in cross-examination): Is it your view that until you are actually using your surplus area, you should not strictly include it as part of the undertaking?

Witness: I look at them as distinct assets. The gas-works are producing a certain profit at the present time; and the other buildings are an asset by themselves producing a certain profit in their own particular direction—these being, of course, an asset for the future of the Company. At present they are something separate.

With regard to the profits of the undertaking, would you not expect in a case where there was such a phenomenal increase as there was here, that the progressive condition of things should reflect itself in the low price of gas? Instead of that, you find they never lowered the price here but once, away back in 1908.—Probably the price was so reasonable that there was no need for lowering it.

Can you suggest that the price was so very reasonable in view of the table you have yourself put forward?—I suggest for Leven, being placed in Fifeshire, the price is reasonable. You will observe that the price for power is 2s. 11d. per 1000 c.ft.—a deduction of 5d.

I put it to you that the profits that were being made (apart from little discrepancies between our accountants) up to 1914 amounted to 17d. or 18d. per 1000 c.ft., and that this represents two or three times what a statutory company would be allowed to charge?—The amount of profit, of course, required to meet a reasonable dividend to the shareholders bears relation to the capital expended. In my own case at Alloa, the capital required is only 5d. per 1000 c.ft.; but there you have an undertaking with an extremely small capital relative to its output.

The OVERSMAN: What would you say was the reason for the price not being reduced, though there was an expansion of production?

Witness: I am afraid I am unable to say. It would require to be gone into.

In Alloa, what proportion of pipes have you under 2½ in. diameter?—A comparatively small proportion.

You know this Company have been securing for the shareholders a very large return upon the money subscribed, in the shape of dividend, bonus shares, and general additions from revenue to capital. In considering the maintainable profit, do you suggest that these considerations should not be taken into account?—Only if it can be proved that

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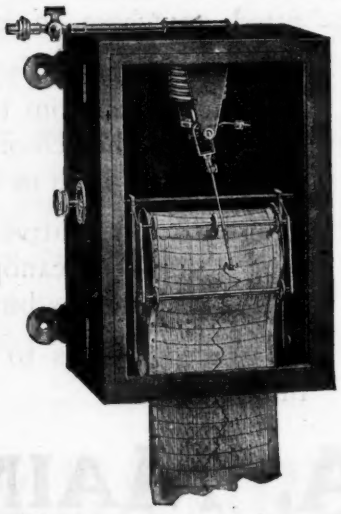

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the Company have been charging a rate for gas greater than they are entitled to.

Mr. WOODALL: Do you say they are entitled to build new works out of profits?

Witness: The works which are the most successful are those which have a low capital debt at the present time; and while it does not always follow that they are selling gas at a low price, I think I am safe in saying they are selling it at a reasonable price.

Mr. *A. D. Huxton*, an architect and surveyor, valued the heritable properties on land adjoining the gas-works, and multiplied it by seventeen years' purchase. He brought out a total of £2430.

Mr. *Andrew Hogg*, the Chairman of the Gas Company, said he considered the works at the present time were in a perfect state for production. They had never in any way starved the upkeep to show a greater profit. The pipes and mains had been practically all renewed within twenty years. He thought the Company's claim of £72,200 was a very reasonable one.

Cross-examined, witness said he thought their prices had compared favourably with those of other places of the same make of gas. The Company were out partly for themselves, but partly for the community as well.

Mr. CONSTABLE: My difficulty is in seeing where the community came in at all. You did not put it in your pocket, that is quite true; but when you made an extra high profit, you just put it into the capital of the concern. And now you are charging the community for it when they buy. Does it not strike you that for a body of shareholders to go forward and ask from the community a price which is double that which the shareholders have ever in the past had in the market is somewhat extravagant?

Witness: Not looking to the future.

Mr. WOODALL: We have had the accounts for 1920 put in. Mr. Gowans gave the profit for 1919 as £2451. For 1920 there is a balance of profit carried to profit and loss account of £5226, which is more than double the profit you made in 1919. Does that show that you had considered the consumer in raising the price in 1919?

Witness: In the circumstances during that year it was very difficult to know, owing to the rise and fall in the price of coal.

Mr. MONCRIEFF: Do the accounts of 1920 show that, of the profit of £5226, only £1800 was distributed to the shareholders of the Company, and £3426 was put into the business, and so goes to the purchasers, and not to the Company?

Witness: That is so.

Mr. *Peter L. Readdie*, Secretary and Manager to the Company, said he now had a salary of £350. In addition, he had a free house, coal, gas, and a garden. His father was Manager before him. He spoke to the consumption of gas for public lighting, and other matters relating to the working. He was also questioned about the share transfers—particularly an offer made of 75 shares in the year 1917 at 42s. 6d. per share.

This concluded the case for the Company.

DYES AND THE TEXTILE INDUSTRY.

Need for Government Action.

Among the speakers on the subject of dyes and the textile industry, in the House of Commons Commercial Committee, was Mr. W. J. U. Woolcock, C.B.E., M.P., General Manager of the Association of British Chemical Manufacturers. He was one of the original members of the Dyes Advisory Committee set-up by the Board of Trade. It was the Association of British Chemical Manufacturers who, with the assistance of the Government, sent to Germany the expert mission that inquired into the position of the German chemical industry at the close of the war.

Mr. Woolcock said that the outstanding feature which was bound to strike any careful inquirer who attempted to review the history of the dye industry in this country, was that the industry had never had a fair chance of development. The industry was handicapped from the commencement by the fact that the extent of the problem was never fully realized. It was thought to be a question of making dyes; but it was infinitely more than that. Long before it became a matter of producing the colour, intermediates had to be made; and, further back still, adequate supplies of raw materials for the making of the intermediates had to be assured, and markets found for the bye-products. It was an astounding fact that there was no attempt made at any co-operative effort in which manufacturers of heavy chemicals, of fine chemicals, of tar products, and of explosives were induced to play their part. All this was impressed on the Government by the Association of British Chemical Manufacturers more than two years ago; but the result had not been proportional to the effort then made; and if the House of Commons did not insist on the problem being dealt with immediately, the country might find itself in a perilous condition. If he carried them with him in his contention that it was essential for the safety of the nation to have a dye industry in this country, they must consider the methods whereby this could be brought about. Two things were essential—that the Government should take a wider view of their responsibilities and encourage the co-operation of all who could assist, and that the Government should at once (next year would be too late) introduce a Bill granting some assistance to the industry for a few years. The question was, "What form should this assistance take?"

He suggested that they could not do better than adopt a system of prohibition except under licence, with this important modification—that it was understood that licences for any particular dye which was needed should be freely granted as of right, unless and until the British manufacturer had shown cause why the particular dye should not be admitted in unrestricted quantities. In this way, they would stimulate efficiency in a manner which bounties and subsidies would never do. There were many details to safeguard maker and user. But urgent action was needed; and a system of licensing modified as described was the least objectionable method which could be adopted.

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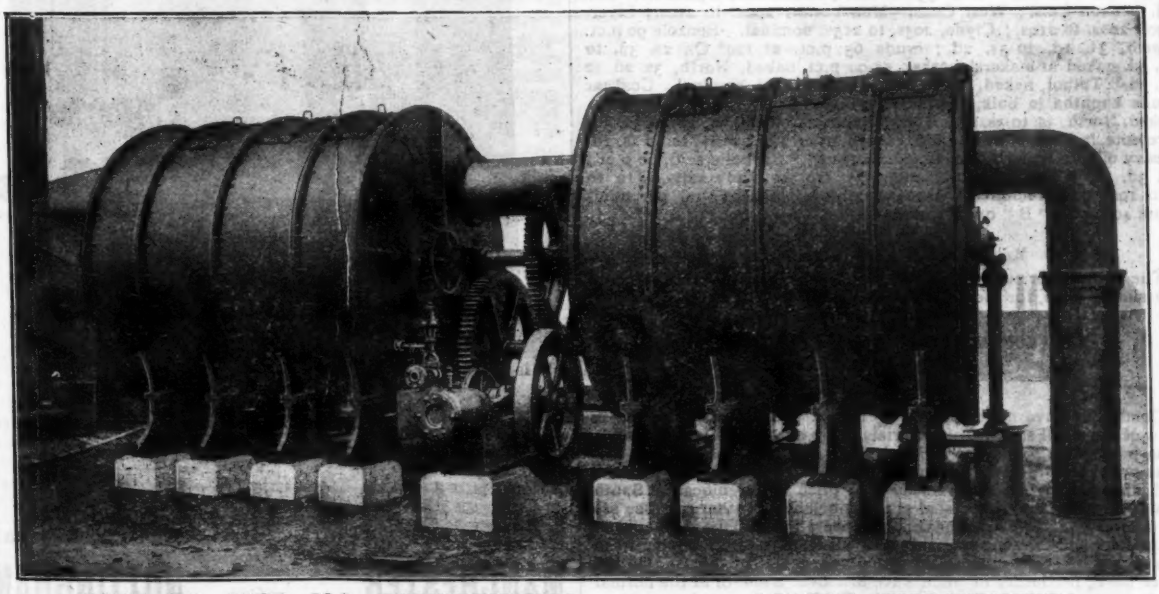

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SOUTHEND GAS COMPANY AND THE LEIGH WORKS.

Negotiations for Sale.

The Special Gas Committee of the Southend Town Council have considered the question of the gas supply for the borough, in view of the extraordinary demand which will in all probability be made upon the Leigh and Southend Gas-Works in the future. The Committee have had correspondence with the Southend Gas Company and an interview with the Company's representatives, at which they discussed the matter. Subsequently they asked if the Company would be prepared to entertain in principle either the sale of their undertaking to the Corporation, or alternately the purchase of the Corporation's works at Leigh.

In the event of the Company being prepared to entertain either alternative, the Committee asked them what their views were as to the basis upon which the purchase-money should be determined, and whether in the event of the adoption of the second alternative they would be willing, as part of any arrangement, to accept an obligation to discontinue within a time to be specified the manufacture of gas on the site of the present Leigh works.

The Company's reply is to the effect that they are not disposed to entertain a proposal for the sale of their undertaking to the Council. With regard to the second alternative—namely, the purchase by the Company of the Leigh undertaking—the Company state that, in view of the attitude of opposition adopted to their proposal in 1914 to include in a Bill then being promoted powers for them to acquire the undertaking, the Company had regarded, and still regard, the project as unlikely of fruition; but they are willing to give the subject further consideration, provided the Council will pass a resolution affirming the principle of sale conditionally upon satisfactory terms being arranged. They state further that, while they have no definite proposal to make under this head, working arrangements might possibly be devised so that in course of time the Leigh works could be abandoned.

The Committee have resolved to ask the Council for authority to treat with the Company, with a view either to the sale to them of the Leigh undertaking or the purchase by the Council of the Company's own works. The Committee themselves favour the former proposal, and point out that it is essential that the Leigh Gas-Works should be removed from the present site, both in order to improve the amenities of the neighbourhood, and because in the course of a very few years the demand for gas cannot be met there.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Nov.* 15.

The market for tar products is quiet; but prices generally remain steady. Current values are as follows: Pitch is not below 225s. per ton f.o.b. makers' works. Creosote is from 1s. 4d. to 1s. 4½d. per gallon. Pyridine is about 18s. per gallon. Pure benzole and pure toluol are 4s. 3d. to 4s. 6d. per gallon; solvent naphtha about 3s. 6d. per gallon. 48-50 p.ct. anthracene is 1s. 4d. per unit, casks free.

In sulphate of ammonia, there is nothing new to report.

Tar Products in the Provinces.

Nov. 15.

The average values for gas-works' products during the week were: Gas-works coal tar, 128s. to 133s. Pitch, East Coast, 207s. 6d. to 212s. 6d. per ton f.a.s.; West Coast—Manchester, 200s. to 210s.; Liverpool, 200s. to 210s.; Clyde, 205s. to 215s. nominal. Benzole 90 p.ct. North, 3s. 1d. to 3s. 2d.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 3s. 2d. to 3s. 3d. Toluol, naked, North, 3s. 1½d. to 3s. 2½d. nominal. Coal tar crude naphtha in bulk, North, 1s. 2d. to 1s. 3d. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 1d. to 3s. 3d. Creosote, in bulk, North, liquid, 1s. 0¾d. to 1s. 1¾d.; salty, 1s. to 1s. 1d. Heavy oils, in bulk, North, 1s. 1d. to 1s. 2d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £37 10s. to £40; salts, £10 to £10 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

Manchester District Tar Prices.

The average price realized for tar in the Manchester district on the sliding-scale, for the month of September, was £8 16s. 8·75d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Conditions have not changed very much. Business is not active in view of the small supplies of materials being offered, while at the same time people are somewhat inclined to be suspicious of values. The coke-ovens are gradually getting back to work; but it is a slow process, and much care is needed. Business in pitch is insignificant. South Wales buyers are not interested at the moment, or rather say they are not interested. The strike has enabled them to postpone deliveries of briquettes; and they can probably wait a little time before buying fresh lots of pitch. Consequently, they look for a fall in values. On the other hand, producers of pitch have lost over a month of the normal production, and naturally are not inclined to offer at lower rates. On the whole, a firm, if not a rising, market is being looked for in most provincial centres. Carbolic acid still remains very flat; crude carbolic 60's is 3s., and new crystals are offered in the North at 10d. per lb. There is no demand for cresylic acid. American needs having been satisfied, about 4s. per gallon is the selling value. Creosote is very firm, with sales reported at 1s. 4d. per gallon. Other products are unchanged from last week's quotations.

Latest values are as follows:

Benzole: 90% London 4s. 1d., North 3s. 10d. to 3s. 11d.;

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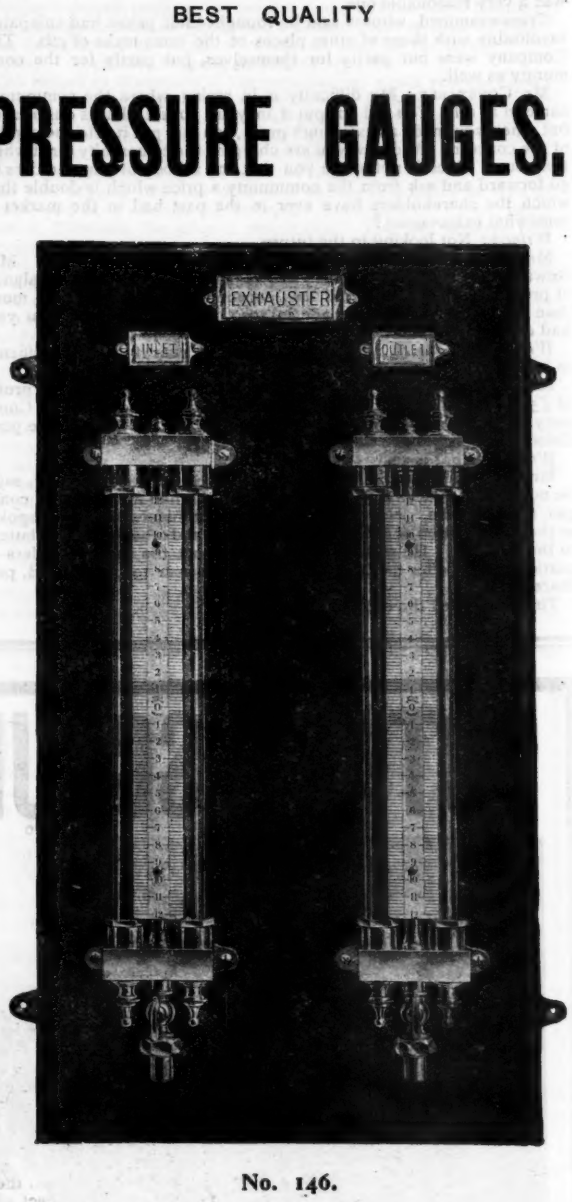

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Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 225s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 215s., with Manchester 210s. per ton, and Glasgow 215s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 3s. 6d.; Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 1s. 1d. to 1s. 2d.; North, 1s. per gallon.

Heavy Naphtha: 3s. 8d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £17 to £28 per ton, according to quality.

Toluol: Naked, 3s. 4d. per gallon nominal; North, 3s. 2d.; pure, 4s.

Creosote: London, 1s. 3d. to 1s. 4½d.; North, 1s. 3½d.; heavy oil, 11½d. per gallon in bulk.

Anthracene: 40-45%, 1s. 4d. to 1s. 6d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 10d. per lb., drums extra.

Aniline Salts: 1s. 11d. to 2s. per lb.

Cresylic Acid: Crude, 4s. 3d.; 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. to 5s. 6d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. per gallon; crystals 40%, 9d. per lb. nominal.

Salicylic Acid: Technical, 2s. 6d.; B.P., 3s. 2d. per lb.

Xylol: Pure, 5s. 9d.; commercial, 5s. per gallon.

Resorcin: 16s. to 17s. per lb.

Alizarine 20%: 2s. per lb.

B. Naphthol: 4s. 2d. per lb.

Sulphate of Ammonia.

Trade remains quiet. Smaller orders than customary for March and April deliveries appear to be the present tendency, which gives grounds for anticipating rather better export business—in quantity, at any rate. News from America is to the effect that there has been a lack of any pronounced demand either for domestic consumption or export purposes. A better feeling, however, is said to be prevailing.

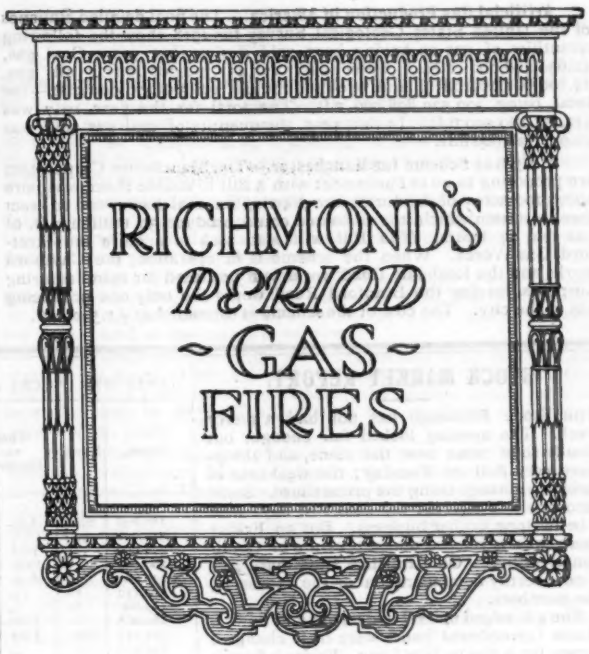
Lighting and Heating on the Becontree Estate.

The Housing Committee of the London County Council having had under consideration the question of the steps to be taken for the lighting of Becontree—which as regards gas is within the area supplied by the Gas Light and Coke Company, and is served as regards electricity by the local authorities in the Ilford and Barking districts and by the London Electric Supply Company in the remaining area—propose that, as a general principle, electricity shall be used for lighting purposes in the streets at Becontree having sites fronting thereon available for leasing, and in the buildings abutting on such streets; and that for the present gas, to the exclusion of electricity, shall be employed on the remainder of the estate. They, therefore, decided to recommend to the Council: (*a*) That, subject to the approval of the Minister of Health, an agreement with regard to lighting installation at Becontree be entered into with the Gas Light and Coke Company for the supply of gas for cooking and heating purposes only to houses to be lighted by electricity (not exceeding 25 p.ct. of the total number of houses completed within the next three years), the Company providing gas-cooker and hot-water heater, in consideration of the Council supplying two built-in gas-fires in houses having more than four rooms and making a capital payment of £8 a house; and for the supply of gas for lighting, cooking, and heating purposes to the remaining 75 p.ct. of the houses completed within that period, the Company supplying all necessary fittings for lighting and cooking, including gas cooking-stove and water-heater, and piping to two gas-fires in each house, in consideration of a capital payment by the Council of £5 a house, and the Council supplying two built-in gas-fires in houses having more than four rooms. (*b*) That, subject to the approval of the Minister of Health, an agreement be entered into with the Ilford Urban District Council for the installation of an electricity supply to certain of the roads at Becontree free of cost to the Council, on the condition that all the houses in any road in which it is desired that electric mains shall be laid are wired for electric light, and that such roads are adjacent to roads in which mains are already laid; the agreement providing for the connection of the houses with the mains to be carried out and paid for by the lighting authority—the Council at their own cost wiring the houses with steel conduit and providing the necessary pendants and switches.

Fee for Examining Meter Inspectors.—Under the Sale of Gas Act, 1859, and the Gas Regulation Act, 1920, the Board of Trade, with the concurrence of the Treasury, direct that the fee charged in respect of the examination of persons nominated by an appointing authority for the post of Inspector of Gas-Meters shall be £1 10s.

Prepayment Meter Excess Charge Dispute.—The Brechin Gas Company demanded payment of a sum in excess of the amount collected from the slot-meters, owing to the rise in cost of coal and wages. They intimated by public advertisements and posters that the surcharge would be made; but notwithstanding this some of the consumers declined to pay the increase. Mr. D. Dundas was prominent in refusing; and the Company raised an action against him. The sum sued for was, however, eventually paid by him, with expenses, before the case came into court.

Influence of Coke Prices at Carlisle.—On the recommendation of the Gas Committee, it has been decided by the Carlisle City Council to withdraw, during the current quarter, the rebate of 9d. per 1000 c.ft. which has been allowed to gas consumers for some time past. The price of gas is now 4s. 6d. per 1000 c.ft.; and the large profit of over £28,000 which was made last year was due to the high price obtained for exported coke, which exportation has now been stopped. The Chairman of the Gas Committee stated that coal must cost from £17,000 to £18,000 more this year than it did last, and wages at least £14,000 more.



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The **Empire.**

Richmond

Artificial Gas Production in America.—The final detailed statistics of the United States Geological Survey for 1918 show the following quantities of gas as having been sold during that year: Coal gas, 42,630,448,000 c.ft.; water gas, 175,431,370,000 c.ft.; oil gas, 14,100,601,000 c.ft.; and bye-product gas, 158,358,479,000 c.ft.—the total being 390,520,898,000 c.ft. The total for the year 1917 was 342,151,129,000 c.ft. In that year, the quantity of coal gas sold was 42,927,728,000 c.ft.

A Big Gas Scheme for Manchester.—The Manchester Corporation are proposing to go to Parliament with a Bill to enable them to acquire about 160 acres of land near the Partington coal basin, and to erect there a station which it is estimated could produce 30 million c.ft. of gas per 24 hours. The Bill will also seek to acquire the Stretford Gas-Works. When the scheme is in operation, the Gaythorn works and the Rochdale Road works will be closed for manufacturing purposes, leaving the Bradford Road works the only one producing gas in the city. The cost of the scheme is estimated at £1,500,000.

Opposition to Perth Gas Scheme.—Ratepayers during the recent election campaign showed objection to the Perth Town Council entering into so big a scheme as that for which they recently sought the permission of the Secretary of Scotland to borrow £65,000. This outlay was for the installation of vertical retorts. A petition has now been forwarded to the Scottish Office, asking the Secretary to defer action in the matter until the new Town Council have had an opportunity of giving the subject their full consideration.

Gas for the Manchester Housing Scheme.—Gas for heating and cooking is being provided in the schemes of the Manchester Housing Committee; and it is said to be possible that on some of the estates "gas will also be adopted for lighting." Each house is being fitted with a gas-cooker of modern type and adequate capacity for the size of the family; while for heating, gas-fires are being fixed in all the rooms, except one bedroom and the kitchen. Coal grates of special construction will be fitted in the kitchen with a view to getting a maximum amount of heat from the coal used.

STOCK MARKET REPORT.

THE Stock Exchange has not had a merry week. The opening looked fair enough, but clouds soon came over the scene, and things were very dull on Tuesday; the weakness of foreign exchange being the prime cause. Some recovery was effected the next two days with a better tone livelier business. But on Friday there was a relapse under pressure of Continental selling. On Armistice Day, there was a noteworthy demonstration in the House by the members.

The gilt-edged market had its ups and downs. Home Government issues were little changed, except for a rise in War Loan. Friday's figures were as follows: Consols 44⅞-45⅛, War Loan 83⅛-83⅜, Funding 67⅝ 68, Victory 73⅛-74. Bonds were rather shifty; but Corporations were supported. Home rails—other than prior charges—were dull, and Argentines were out of favour.

The Foreign Market was weak for the most part, with free fluctuations; but Mexicans were in demand.

The Miscellaneous Market, with exceptions here and there, was not strong. Rubbers were unable to make a recovery, and Oils were very patchy. Shipping, Iron and Steel, and Textiles were easier.

Business in the Gas Market was fair, and was more evenly distributed through the lists. The London Companies were less active. Gas Light ordinary was lower; but South Metropolitan and Commercial were steady. The South Suburban and Provincial group were hardly changed. In Continentals, Imperial had a reaction from its recent sharp advance, and from a mark of 141½ on Monday it dropped to one of 134, and the quotation fell 6.

Bargains done for cash during the week were as follows: On Monday, Croydon "A" 127½, ditto "B" and "C" 87½, Gas Light ordinary 56½, 57, ditto preference 56, 56½, 57½, ditto 10 p.ct. bonds 132, 133, Imperial Continental 137, 137½, 138, 139, 139½, 139¼, 140, 140½, 141, 141½, ditto debenture 86, 87, Oriental 98½, 99½, Primitiva preference 20s. 6d., South Metropolitan 62, 62⅝, 63¼, ditto debenture 47. On Tuesday, British 21½, Commercial 4 p.ct. 56½, 56⅝, Gas Light ordinary 56, Imperial Continental 135, 136¼, 137, 137½, ditto debenture 89½, 90, South Suburban 57, 59, Sheffield "C" 60⅜. On Wednesday, Alliance and Dublin 39, Bournemouth preference 7⅜, 7⅝, Commercial 4 p.ct. 55½, 56, 56⅜, Croydon "A" 131, Gas Light ordinary 55, 55½, ditto preference, 57, 57⅜, Imperial Continental 134, 134½, 135, 135½, 136, South Suburban 57, ditto debenture 66½, 67½, San Paulo debenture 40½, South California 5 p.ct. preference 108. On Thursday, Commercial 4 p.ct. 56½, Gas Light ordinary 55½, 55½, 56½, ditto maximum 38, Imperial Continental 135, 135½, 136, ditto debenture 89⅜, 90⅜, Primitiva 10s., ditto preference 20s., South Metropolitan 61. On Friday, Bournemouth 5 p.ct. 9, Brentford "A" 54, dittto "B" 50, ditto preference 68½, Commercial 4 p.ct. 55⅜, ditto 3½ p.ct. 48⅛, Continental Union 25, 25¼, European 6⅜, Gas Light ordinary 55, 55½, 55⅜, 56, Imperial Continental 134½, 137½, Primitiva debenture (1911) 39, South Metropolitan, 62½, Tottenham "B" 51½, 52, Barnet District "D" 87.

In the Money Market, the opening position was firmer, and a demand set in and grew until rates materially hardened. Discount terms were very firm throughout. Silver was rather easier. The Bank rate is 7 p.ct., fixed on April 17 last.

Garlogie House, a mansion at Carnoustie, Forfarshire, has been destroyed by fire. An explosion, resulting from a leakage of gas, is believed to have caused the outbreak.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref. .	...	56—61	...
1,551,868	,,	Oct. 14	2½	3⅛%	Alliance & Dublin Ord.	59—64	36—41	39
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	Oct. 28	7½	8%	Bombay, Ltd. . . .	5½—6½	4½—4¾	...
100,000	5	Aug. 12	16	5%		...	8—9	9
383,110	10	,,	7	7%	Bournemouth Gas and Water { 5 p.c. . . B 7 p.c. . Pref. 6 p.c. 4 p.c. Deb.	15—15½	8½—9⅜	...
115,000	10	,,	6	6/-		13¼—14	7⅜—8¼	7⅜—7½
162,065	—	June 25	—	4%		...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid. .	261—266	50—55	54
734,920	,,	,,	11	26/3	Do. B New . .	204—209	47—52	50
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	68—73	68½
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	60—63	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig. .	208—213	120—125	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	20—22	21½
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	39—42	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1¼—2¼	7—7½	...
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	54—59	55½—56½
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	48½
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	25—30	25—25½
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c. . .	...	125—135	127½—131
278,490	—	,,	11½	7½%	Croydon B and C 7 p.c.	..	85—95	87½
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	6¼—7½	6½
16,298,975	Stk.	July 29	4/17/4	30/-	Gas Light and Coke { 4 p.c. Ord. . . 3½ p.c. max. . 4 p.c. Con. Pref. 3 p.c. Con. Deb. 10 p.c. Bonds. .	98—102	55—58	55—57
2,600,000	,,	,,	3½	26/3		76—79	38—41	38
4,062,235	,,	,,	4	4%		96—99	55—58	56—57½
4,674,850	,,	June 25	3	3%		72½—74½	45—48	...
130,000	,,	Dec. 11	10	10%		...	...	132—133
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16¾	8¼—9½	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c. . . .	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C . . .	151—154	79—84	...
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb. . .	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental .	150—160	133—138	134—141½
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	89—93	86—90½
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A. B.	211—213 / 146—148	...	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	3½%	Maidstone 5 p.c. . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4¼—4½	1¾—2¼	...
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	86—93	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd. . .	11¾—12	70—75	...
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	61—63	...
529,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Sept. 15	—	8%	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/0	5½%	,, ,, 7 p.c.	14—15	7—7½	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd. . . .	117—122	98—101	98½—99½
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	2½—2¾	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B . .	128—131	65—70	...
100,000	50	,,	12	6½%	Do. C . .	118—121	50—55	...
249,980	5	April 29	8	—	Primitiva Ord. . . .	5½—6	⅞—1⅛	10/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref. .	4½—5	1—1½	20/—20/6
521,600	100	June 1	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	...
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	39
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	38—43	...
150,000	10	Sept. 30	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10¾—11	6¼—7½	...
125,000	50	July 2	5	5%		47—49	38—40	40½
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	64—66	...
209,984	,,	,,	10	4%	Do. B	222—224	59—61	...
523,500	,,	,,	10	3½%	Do. C	220—222	59—61	60½
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c. . .	...	...	...
90,000	10	Sept. 30	9	9%	South African . . .	10¾—11¼	10¼—11½	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. Ord. . .	111—113	61—64	61—63½
250,000	,,	July 14	—	5%	Do. Red. Pref. .	...	91—93	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb..	72½—74½	43—48	47
224,820	,,	Aug. 27	8½	3%	South Shields Con. Stk.	157—159	95—96	...
1,087,793	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	57—62	57—59
247,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	65—70	66¼—67½
647,740	,,	Nov. 12	7½	3½%	Southampton Ord. . .	99—102	55—58*	...
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham District { A 5 p.c. . B 3½ p.c. . 4 p.c. Deb.	135—138	60—65	...
782,275	,,	,,	6	2½%		115—117	50—55	51½—55
181,255	,,	June 10	4	4%		87—89	57—60	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd. . . .	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Sept. 15	5	3½%	Tynemouth 5 p.c. max.	108½—109	69—71	...
30,000	,,	Aug. 27	8½	47/6	Wandsworth, Wimbledon, and Epsom—			
253,636	,,	,,	6½	32/6	Wandsworth A 5 p.c.	151—156	75—80	...
108,075	,,	,,	—	33/3	Do. B 3½ p.c.	129—134	53—58	...
140,865	,,	,,	—	33/3	Do. C . . .	...	50—55	...
352,000	,,	,,	6½	26/3	New Ordinary	...	50—55	...
98,000	,,	,,	6½	32/6	Wimbledon 5 p.c. . .	117—122	43—48	...
88,416	,,	June 25	3	3%	Epsom 5 p.c. . . .	121—126	50—55	...
					3 p.c. Deb. Stk. . .	66—69	44—47	...

* Ex Div.

Worle Gas Company Wound Up.—A meeting has been called of the shareholders in the Worle Gas Company, Ltd., to have an account laid before them of the manner in which the voluntary winding-up of the Company has been conducted and the property disposed of.

Joint Gas Board for Prestwich.—There is a proposal on foot to form a Joint Gas Board for the Prestwich District. Associated with the Prestwich Urban District Council in the undertaking are the Councils of Radcliffe, Whitefield, and Little Lever. At present the principal gas supply throughout the areas controlled by these four local authorities is provided by the Radcliffe and Pilkington Gas Company. It is intended to erect new gas-works.

Street Lighting at Walsall.—Complaint was made in the Walsall Town Council relative to the present condition of street lighting. Mr. Thickett said that 815 lamps out of a total of 1398 were lighted; and he thought it was time all were put into use. Some of the streets were in almost total darkness. It might be urged that the matter was in the hands of the Chief Constable; but he was tired of such statements. The automatic lighting was not a success. Mr. Venables (the Chairman of the Gas Committee) replied that, in regard to street lighting, they had only obeyed orders. As to the automatic lighters, it was expected they would not work smoothly for some time; but an improvement had been shown.

Councillor Thomas Duxbury, upon being elected Mayor of Darwen, his native town, declared that municipal waste must be immediately stopped. Government officials had too big notions, and were forcing the local authorities into the same habit.

A verdict of "Poisoned himself with coal gas while of unsound mind brought about by depression," was returned at an inquest last Thursday, at Batley, upon John Howard, a railway agent, who was found in a bedroom with a rubber tube connected with the gas-bracket and the other end near his face, and the gas turned on. A counterpane was wrapped over his head.

The Crieff Gas Light Company have raised the price of gas by 7½d., making it 6s. 0½d. per 1000 c.ft.

The Ardsley District Council have decided to send a deputation to the Barnsley Gas Company to complain of the poor gas supplied to the township, and to ask for some improvement.

At Konigshutte, in Germany, a gas-main connecting Bismarkshutte with the Kleophasmine, a distance of over a mile, was sawn through, and fired. About 32,000 c.m. of gas were burnt; and various persons were asphyxiated.

The Stockton-on-Tees Town Council have agreed to a recommendation that an honorarium of £50 should be granted to the Assistant Gas Manager (Mr. F. L. Scaife), in consideration of his extra services during sixteen weeks early in the year.

The Lurgan Urban District Council have decided to erect the new electricity generating station in the gas-works' yard, and to allow Mr. W. Tallentine (the Gas Manager) a payment of 2½ p.ct. on the engineering work, based on the capital expenditure.

The Walsall Gas Committee have decided that in all future extensions of gas-mains in districts where it is anticipated the consumption will not yield a profit to the undertaking, the persons asking for such extension shall be required to guarantee 10 p.ct. of the outlay for a period of ten years.

When during the course of the last municipal year the Nottingham Corporation were faced with the unusual experience of having to elect another Chief Magistrate in place of one whose period of office had been only half completed, it was at the unanimous desire of all parties in the Council that Alderman Albert Ball (Chairman of the Gas Committee) consented to fill the vacancy, occasioned by the enforced retirement through ill-health of the occupant of the position. At the annual meeting last week, cordial recognition was forthcoming of the services which he had rendered to the municipality in again undertaking duties which he discharged with distinction several years previously.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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(W. T. P. CUNNINGHAM, Proprietor.)
13, ARCADIAN GARDENS, WOOD GREEN, LONDON, N. 22.
Telegrams: "Bripurimat, Wood, London."
'Phone: Palmers Green 606.

NATIONAL ASSOCIATION OF TECHNICAL GAS OFFICIALS.

Head Office:—Temple Courts, 55, Temple Row, BIRMINGHAM.

Full particulars for membership, &c., can be obtained from the General Secretary.

GAS REGULATION ACT.

GAS Accountants, experienced in Gas Regulation Act Applications, will undertake the preparations of Schedules and Particulars for Applications to Board of Trade for any Undertakings desiri g assistance.
Address No. 6993, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

BRADFORD-ON-AVON GAS COMPANY.

THE above Company invite Applica- tions for a Thoroughly Practical MANAGER for their Gas Works.
Annual make, 20,000,000 c.ft.
Applications, stating Age, Experience, Salary required, Date able to Commence Duties, and enclosing *Copies* of Three Recent Testimonials, to be addressed to the undersigned not later than Nov. 30th.
T. B. SILCOCK, Chairman.
"Walden,"
Widcombe Hill, Bath.

ENERGETIC Young Man required by a Firm of Gas Engineers in Yorkshire, with good knowledge of Chemistry and Experience in Working of Modern Retort Settings. Able to make Tests on Carbonizing Plants. Good opening for the right man.
Apply, in first instance, stating full Particulars of Training and Experience, to No. 6992, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

CHIEF CLERK in Secretary's Office required. Commencing Salary. £250 per Annum.
Applications, stating Age, Qualifications, Experience, and References, to be sent to the GENERAL MANAGER, Gosport Gas and Coke Company, GOSPORT.

PLANT, &c., FOR SALE & WANTED.

REQUIRED—One Second-Hand Cast- Iron Rectangular TANK. Capacity, 20,000 Gallons.
Address No. 6991, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

GATEHOUSE-OF-FLEET GAS-WORKS, KIRKCUDBRIGHTSHIRE.

FOR SALE, by AUCTION, as a Going Concern, at the Premises, on Thursday, 25th of November, 1920, at 1.30 p.m.

SHIRLAW, ALLAN, & CO., Auctioneers, Hamilton, have received Instructions from William McConnel, Esq., Solicitor, Gatehouse-of-Fleet, to SELL BY AUCTION:
THE GATEHOUSE-OF-FLEET GAS-WORK UNDERTAKING, comprising Land, Buildings, Producing Plant, Mains, Meters, Connections, Loose Plant, Stores, &c.
Capacity, about 15,000 to 20,000 cubic feet per twenty-four hours. The Ground extends to about 1150 square yards.
Plant consists of Bench of Four Retorts (Beds of Three and One), Cast Iron Gas Washer, Set of 12 Cast Iron Pipe Condensers, Purifiers, Scrubber, Gasholder (re-Sheeted four years ago), Station Meter, Peebles Patent, Gas Governor, about 1 mile 4-in., 3 in., and 2-in. Cast Iron S & F Gas Mains in Streets, with 58 Slot and Ordinary Consumers' Meters.
The Buildings are Stone and Brick Built, having Slate and Tile Roofs, and are in Good Condition.
The Plant is in Good Working Order; close on £1500 having been recently expended in renewal thereof.
The above, being the only light Installation in the district, forms an excellent opportunity for a Gas Manager or party with limited Capital securing a remunerative investment.
Low Upset Price of £500, to ensure Sale.
For Particulars of Ground and Conditions of Sale, apply to WILLIAM MCCONNEL, Esq., Solicitor, GATEHOUSE-OF-FLEET, and Messrs. SHIRLAW, ALLAN, & Co., Auctioneers, HAMILTON.

WANTED—Two Gas Exhausters, 20,000 to 30,000 c.ft. per Hour, Either driven by Belt, Gas-Engine, or Electrically (D.C., 500 volts.)
Write No. 6990, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

MILD STEEL WIRE.

ABOUT 100 Tons 14 gauge Annealed Wire, in Coils, to be cleared quickly. It has never been used; but owing to being stored in open, is now rusty—in some cases rather badly.
Will serve excellently for bundling or other purposes.
For immediate orders in ton lots or more, low price of 20s. per cwt., f.o.r. London.
Mention reference KW/9.
THOS. W. WARD, Ltd., SILVERTOWN, LONDON, E.

CONTRACTS OPEN.

COUNTY BOROUGH OF WALLASEY.
(GAS AND WATER DEPARTMENT.)

TO ENGINEERS AND CONTRACTORS.

THE Corporation of Wallasey invite TENDERS for—
(1) The Manufacture, Delivery, and Erection of COMPLETE COKE-HANDLING PLANT at the Corporation Gas-Works.
(2) The Manufacture, Delivery, and Erection of TWO ELECTRICALLY OPERATED CAPSTANS also at the Gas-Works.
Plans, Provisional Specifications, &c., may be seen, and the Site inspected, on application to the Engineer, Mr. J. H. Crowther at his offices at the Gas-works of the Corporation, Limekiln Lane, Wallasey.
Contractors may Tender for either one or both of the above Sections, stating the amounts separately.
Sealed Tenders, addressed to the undersigned and endorsed "Coke Plant" and for "Capstans," "Gas Extensions," to be Delivered per post to my Office not later than Tuesday, the 14th of December, 1920. Tenders arriving at a later time cannot be considered.
There is no Special Form of Tender.
The Contractor will be required to enter into a Bond, with approved Sureties, for the due performance of the Contract.
The Corporation do not bind themselves to accept the lowest or any Tender.
Dated this 10th day of November, 1920.
H. W. COOK, Town Clerk.
Town Hall, Wallasey.

STOCKS AND SHARES.

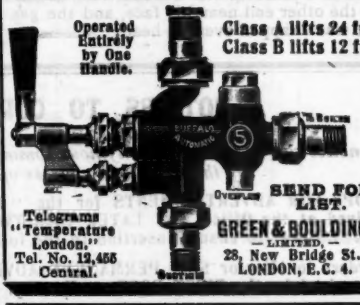
New Issue of Capital of the
ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.
(Incorporated 1866.)

MESSRS. A. & W. RICHARDS (William Richards) are Instructed by the Directors to Issue £50,000 SEVEN PER CENT. REDEEMABLE MORTGAGE BONDS.
Price of Issue, Par.
Redemption at Par on 1st of January, 1931.
The Interest on the existing Loan Capital and on the amount now being issued requires £7251 per Annum, and is a First Charge on the Net Revenue of the Company which, for the year ended 31st of December, 1919, was £28,894.
The New Capital is being raised to pay for Extensions of Works and Plant necessitated by the increasing demands for the three commodities supplied by the Company.
Prospectus and Form of Application may be obtained of Messrs. A. & W. RICHARDS, 37, WALBROOK, E.C. 4. Tel: City 3833.

CASES FOR BINDING
QUARTERLY VOLUMES OF THE "JOURNAL."
Price 4s. each, post free.
WALTER KING, "GAS JOURNAL" OFFICES, 11, BOLT COURT, FLEET STREET, E.C. 4.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER,
Gas Engineers' Agents and Contractors for METERS, FIRE-CLAY GOODS, OXIDE OF IRON, AND ALL OTHER GAS APPARATUS.
Inquiries Solicited.
Telegrams—"DARWINIAN, MANCHESTER."
Telephone—3266 & 3269 City (two lines).

SAVE MONEY
BY DRIVING YOUR AUXILIARY PLANT ELECTRICALLY
I have special experience in this work, and my services are at your disposal.
W. T. WARDALE, A.M.Inst.E.E. 13, The Drive, Marloliffe Road, SHEFFIELD.

'BUFFALO' INJECTOR
Operated Entirely by One Handle.
Class A lifts 24 ft.
Class B lifts 12 ft.

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Telegrams "Temperature London." Tel. No. 12,455 Central.
GREEN & BOULDING, — LIMITED, — 28, New Bridge St., LONDON, E.C. 4.

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SHEAF WORKS, SHEFFIELD,
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FILES OF BEST QUALITY
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STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.
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CAST IRON PIPES
FOR
GAS, WATER, & STEAM
1¼in. to 12in. BORE.
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Bonlea Foundry,
THORNABY-ON-TEES.
Telegrams: "BONLEA, THORNABY-ON-TEES."